

ANNALS OF MEDICAL HISTORY

PUBLISHED BIMONTHLY

NEW SERIES, VOL. IV, No. 6

NOVEMBER, 1932

WHOLE N^o. 64

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NEW YORK,

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SEVENTY-SIX FIFTH AVENUE

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Original articles are published only with the understanding that they are contributed exclusively to the ANNALS OF MEDICAL HISTORY. Manuscripts offered for publication, books for review, and all correspondence relating to the editorial management should be addressed to the Editor, Dr. FRANCIS R. PACKARD, 302 South 19th Street, Philadelphia, Pa.

Communications regarding subscriptions, reprints, and all matters regarding the business management of the ANNALS OF MEDICAL HISTORY should be addressed to the publishers, PAUL B. HOEBER, INC., 76 Fifth Avenue, New York City. [Cable address, Formed N. Y.]

The ANNALS OF MEDICAL HISTORY is published six times a year, the six issues comprising one volume. No advertising is carried. The subscription price is \$10.00 a year, foreign \$11.00. Current single numbers \$2.50 per copy. A few sets of first series, Volumes I-X, are available in parts as published at \$100.00 per set, or bound in boards, paper sides, canvas back, paper label, \$135.00 per set. Price on available single volumes or numbers will be quoted on request.

Entered as second-class matter, June 2, 1917, at the Post Office, New York, N. Y., under the Act of March 3, 1879.

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Frontispiece
Annals of Medical History
November, 1932



WILLIAM SHIPPEN, JR.

[1736-1808]



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[From Schenckius: *Observation um Medicarum, Francofurti, 1609.*]

ANNALS OF MEDICAL HISTORY

NEW SERIES, VOLUME IV

NOVEMBER, 1932

NUMBER 6

ROBERT KOCH*

[1843-1910]

By GERALD B. WEBB, M.D.

COLORADO SPRINGS, COL.

E'en to the highest hath he winged his flight,
In close communion linked with all we prize.
Extol him then! What mortals while they live
But half receive, posterity shall give.

GOETHE.

I press my wreath
Upon the lofty master's noble brow.

GOETHE.



WE celebrate this year the jubilee of the discovery of the tubercle bacillus by Robert Koch and this year also happens to be the centenary of the death of the poet-naturalist Goethe (1749-1832).

The greatest discoveries of these splendid scientists were published, as models of scientific presentation, about one hundred years apart. Goethe announced his discovery of the intermaxillary bone in man, "modestly hiding itself for fear of betraying

animal voracity," March 27, 1784; Koch produced his immortal paper on the discovery of the tubercle bacillus on March 24, 1882.

According to Goethe "science developed out of poetry" and "without imagination a great naturalist is inconceivable"; and the famous Helmholtz later added "the investigator must possess some of the intuition of the poet." It has seemed appropriate to employ in this tribute to Robert Koch quotations from his immortal fellow-countryman, Johann Wolfgang von Goethe.

Robert Koch was born December 11, 1843, in Clausthal, Germany, the third son of parents whose family eventually numbered thirteen children. The father, engaged in the mining industry of the Harz mountains, had little time to devote to his children. Robert was a precocious lad, reading the newspaper at five, and displaying in his boyhood an intense passion for the study of nature. A

*Presented at the Annual Banquet of the National Tuberculosis Association, Colorado Springs, Col., June 6, 1932.

brother wrote of him, "While we gave our time to youthful games, Robert gave his to nature study and his favorite occupation was to examine moss and lichen with the magnifying glass and to study all kinds of animals." Robert roamed the Harz mountains collecting specimens of minerals, plants, insects and animals. He was especially stimulated in these investigations by an uncle, Dr. Biewend, who had a wide knowledge of nature. From this uncle Robert also learned the art of daguerreotype and photography which he later used to great advantage in portraying his microscopic work.

Robert entered the Clausthal gymnasium in 1851 and at once attempted to "make all knowledge his own." His recreation was the piano, the zither and chess. While Robert loved music, he attained his greatest proficiency in chess, mastering the game and becoming the school champion. The boy seemed to have a natural *Wanderlust* and while his father at first wanted to apprentice Robert to the shoe trade the boy had a longing to see the world. Even when the family finances improved so that Robert could be sent to the University of Göttingen to study medicine, which to the boy's mind was connected with nature, Robert pursued his studies with the idea of becoming a ship's surgeon so that his desire for travel could be indulged.

Entering the University of Göttingen in 1862, Robert plunged into his work so assiduously that only on Sundays could he indulge himself in his botanical excursions. In his later life Koch, recalling his university days, stated that he had received no special stimulation for his future bacteriological researches but that his

sense of investigation had been aroused by Henle, the anatomist, Hasse the clinician, and Meiszner the physiologist. Robert was so earnest in his medical studies that he would cut short his Christmas holidays. Fearing his father had not been impressed with his efforts Robert wrote proudly, in 1865, that "just as a blind dove might find a piece of corn" so he had received a prize for an investigation he had made which proved that there were no ganglion cells, as had been previously claimed, on the nerves of the uterus. The student took for his motto for the paper which won this prize, "Nunquam otiosus" (never idle).

It was about this time that Robert's proud mother wrote concerning him that he was a most delightful companion with clear vision and wise counsel. She delighted in his versatility exclaiming that with one he would play chess, then he would dress a wound, he could poach eggs well for the young ladies on picnics, or entertain an elderly companion in a tramp through the Harz mountains. Goethe had found relaxation and vigor himself in these mountains and a poem he wrote, entitled "The Hartz Mountains," contains the following lines.

Sure a God hath
Unto each his path
Fore-appointed,
Which the fortunate
Swift to happiest
Goal pursues.

That Robert Koch pursued the goal of his fore-appointed path, swiftly, is evidenced by his graduation *eximia cum laude* in 1866, when he presented some new research work on succinic acid in his *Doktor-dissertation*. Disappointed in some postgraduate work he took immediately in Berlin, the idea

again came to Koch of becoming a ship's-surgeon and seeing the world, so he passed an examination for a posi-

twenty-three, and a daughter, his only child, on whom he doted, was born to this union. The wife lived only

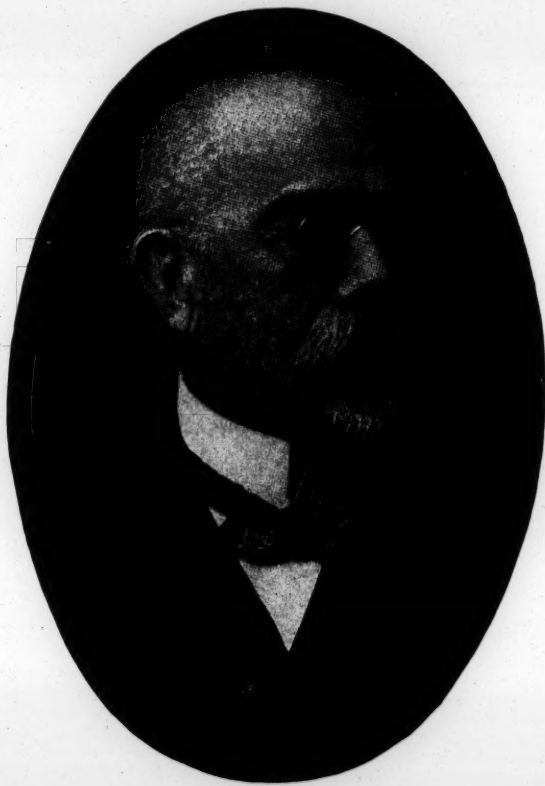


FIG. 1. ROBERT KOCH (1843-1910).

tion in a Hamburg hospital.

Meanwhile he had become engaged to Emmy Fraatz, of his native town, and Emmy opposing the ship's-surgeon idea, the Hamburg position was abandoned after three months, and Koch became resident physician in an institution for the insane in Hanover with opportunity for local practice. Success soon demanded the purchase of a horse and a letter to Emmy declared his wish "Häuslichkeit zu Erfüllung." The wedding took place July 16, 1867, when Robert Koch was

a few years.

But a restlessness was still dominant in Koch and after two years he resigned from the institution for the insane in Langenhagen and we find him practicing in Niemegek, near Potsdam, and Rackwitz in Posen. Two student brothers visiting Robert, from Berlin, desiring a loan found Robert with only one dollar to his name. In 1869 his mother wrote: "It goes unusually badly with us and we must greatly economise. Even then we may not pull through. Robert has lost all

hope and again has the notion of going abroad." An accident to a man of means and the collection of a fee helped to stay Robert's determination to join a brother who had migrated to the United States.

Koch's practice grew at Rackwitz and in one year about 1100 dollars were collected. Here also he could indulge his hobbies, dissecting and investigating all kinds of animals, and he had enough leisure for his zither and games of ninepins.

In 1866 Koch had been exempted from military service because of extreme myopia, but in 1870, when the Franco-Prussian war broke out, he immediately offered his services and we find him with a field-hospital completely disillusioned of the romanticism of war, but getting an amazing amount of medical experience. Later he is found caring for typhoid patients at a hospital in Neuf-Chateau, which was to be, in the World War, the headquarters of the medical consultants of the A. E. F. Koch was solicitous for three brothers in the service and sought them out, trying to lessen their hardships with little gifts and with visits. Early in 1871 the magistrate of Rackwitz sought Koch's release from military service on account of the clamor of his patients. A happy visit home, and the acclaim of his patients on reaching Rackwitz, was soon saddened by the death, from pneumonia, of his wonderful mother. Koch's growing fame as a physician led to his being sought as district physician at Wollstein in Silesia in 1872. Here he became so popular that all requested his services.

Meanwhile Koch had married again and on his birthday his second wife, who failed to present him with children, presented Robert with his life's

desire, a microscope. Fascinated by microscopic work Koch engaged an established practitioner to take over many of his patients so that he himself could devote every possible hour to research, a quality unfortunately too rare, but an activity which from now on was to dominate his life.

The countryside around Wollstein was a region where anthrax was destructive to sheep and cattle and occasionally attacked man. Pollender, in 1849, and Brauell, in 1857, had noted rodlike forms in the blood of animals dying of this disease. Davaine, in 1863, had shown that the inoculation of blood containing these rodlike forms into other healthy animals would produce anthrax. While Davaine did not believe natural infection was produced in this manner, yet he thought these rods might retain their vitality outside the body, and finding their way into an animal might cause disease. Some later investigators were puzzled when they could not find these rods in animals dying of anthrax and also could produce the disease in normal animals by the injection of blood from sick animals in which the rods had not been found. With primitive equipment and remote from scientific institutions, Koch resolved to attempt to clear up these mysteries.

Using a hanging drop of aqueous humor from a rabbit's eye and keeping his microscope warm Koch saw the little rods of anthrax developing into threads and under certain conditions forming spores. He then noted the development of the spores into bacilli. The discovery of the spores of anthrax at once explained the discrepancies of other workers. On April 30, 1876, Koch sought an audience with Ferdinand Cohn, the most learned author-

ity on bacteria, at Breslau, and a great admirer of Goethe's work on the metamorphosis of plants. Cohn had already guessed at the possibility of spores. Cohnheim was also working in Breslau with Dr. William H. Welch, a former president of the National Tuberculosis Association, as one of his students. In 1890 Cohn wrote to Koch: "I can well boast that in the first moments I recognized you as a scientific investigator." Cohnheim at once advised his students to see Koch and his work, adding: *"This man has made a great discovery which in its simplicity and exactness of method is the more to be wondered at because Koch, cut off from all scientific association, has made this absolutely complete. There is nothing more to be done. I consider this the greatest discovery in the field of micro-organisms and feel it brings shame on us; and Koch will surprise us with still further discoveries."*

Koch went to Berlin to show his work to Virchow but finding Virchow cool and reserved, left him with bitterness in his heart. These two great geniuses never understood each other and as Virchow dominated German medicine Koch studiously avoided him hereafter. This was why, in 1882, Koch read his masterly paper on the discovery of the tubercle bacillus before the Berlin Physiological Society and not before a medical society.

There is here both a parallel and a contrast between the work of Koch and that of Goethe. The poet was also cut off from the scientific world, and to a great extent from scientific men. When Goethe wrote his "Metamorphoses of Plants," he hurled into the field of botany discoveries even more novel than those of Koch.

The ready acceptance which was accorded the physician, however, did not come to the poet for decades. The time was not so favorable; the treatise was more theoretical and rested on fewer proofs. Added to this was the difficulty which men of science had in taking a poet seriously in their own field. Koch never had to face this. Goethe's work, including his conceptions of the vertebral origin of the occiput, and of evolution, met a host of Virchows, where Koch met but one.

In 1877, Pasteur, who had paved the way in bacteriology and immunology, became interested in anthrax. Pasteur believed that earthworms brought anthrax bacilli to the surface from buried sheep and hence a return of anthrax to the pastures. Pasteur developed a method of vaccination against anthrax founded on his immunization work in chicken cholera. He also showed that fowls which appeared immune to anthrax, due, he thought, to their high body temperature, could be infected if their temperature was reduced by prolonged standing in cold water. Koch now showed that earthworms did not carry anthrax, and Kitasato found spore formation absent in sheep buried $\frac{1}{2}$ to 1 meter deep. According to Koch, the pastures were infected by the excreta and blood of sheep sick with anthrax. Curiously Pasteur's work resulted in a campaign against earthworms! Koch was ruthless in his condemnation of Pasteur's work, exclaiming, "Pasteur's teaching of the etiology of anthrax is only a little new, and this new rests on error."

Koch attacked Pasteur's methods of vaccination, the role played by the earthworms, the inoculation of fowls,

and the purity of his cultures. The German school claimed Pasteur did not know how to recognize the septic vibrio, which often accompanied fatal anthrax, although Pasteur himself had discovered it! The opponents met later, in 1882, at an International Congress of Hygiene at Geneva. Pasteur reviewed his own work but made an error in relating some experiments regarding a typhoid disease of horses. Koch refused to reply, saying Pasteur had related nothing new and excusing himself on the ground that he understood little French and Pasteur understood little German. But he promised to reply through the medical journals.

Koch felt that Pasteur's Geneva address had been a polemic specifically attacking himself and his promised paper, "Über die Milzbrandimpfung," came "red-hot from the grill." Hear his invectives!

Pasteur was not a physician and could not be expected to have a correct knowledge of pathology and of the symptoms of diseases. But his medical colleagues should have protected him against the errors into which he had fallen. To try the saliva of rabid animals for immunization and the nasal secretion of horses for vaccination of rabbits against a horse-typhoid condition was nonsense. Saliva and nasal mucus contained many different organisms and what Pasteur claimed as a new disease in rabbits from a "figure of eight" microbe found in saliva, was nothing more than rabbit septicemia, a disease long known and the organism well recognised. Pasteur had not procured his "vaccines" from the tissues specifically attacked in these diseases. Such rubbish should not have been brought to an International Congress.

Pasteur had not published fully his exact methods in attenuating the organisms of chicken cholera or of weakening the anthrax organism for the preparation of "vaccines." This was not scientific as others could not check his results. And these results in anti-anthrax immunization were none too good. Some sheep died from the vaccination. What would one have said of Jenner had he only claimed in his vaccination against smallpox that only a certain percentage of children died from the vaccination?¹ The high temperature of fowls had nothing to do with their resistance to anthrax. Sparrows had the same high temperature and were easily infected. That a weaker vaccine could protect against natural infection than was effective against artificial infection was perfect nonsense.

In the publication referred to on anthrax immunization, Koch announced clearly his four postulates, which had originated with his former teacher Henle. The germ which causes a disease must be found in the diseased organs, must be obtained from these in pure culture, and when this culture is inoculated into susceptible animals the same disease must be produced and the organisms again recovered. This had been shown by him in tuberculosis and by others in erysipelas. Pasteur had cast these postulates aside. It was premature for the Geneva Congress to have welcomed Pasteur as a second Jenner. Jenner's success had been with man

¹ The controversy was not unlike that of the opposition to Calmette's B.C.G. vaccination against tuberculosis, and just as Pasteur's immunization against anthrax triumphed so we hope that Calmette, who has recently paid a delightful tribute to Koch, will also triumph.

and not with sheep. Not until attenuated organisms had been proved to protect man against such diseases as tuberculosis, typhoid, or erysipelas, should such a new triumph be celebrated. In extenuation it must be recalled that the bitterness of the Franco-Prussian war had not entirely died out. Pasteur had indeed made mistakes and some of his work smacked of the "hit or miss" order. If Pasteur was indeed impetuous, Koch was of "the dogged as does it" type. But Pasteur was a master-architect of scientific medicine, Koch was a master builder.

We must retrace our steps a moment, to 1877, to mention Koch's work in "fixing" bacteria for microscopic examination and their exact reproduction in photography. As he himself expressed the situation in bacteriology: "The literature on bacteria had been allowed to swell into a muddy stream."

Microphotography was an exact method of study and he wished to develop the technique so that he could show microorganisms in tissues. Koch employed for this purpose Weigert's methods of staining with aniline dyes. To improve his microscopic work he added the Abbé condenser, the diaphragm, and the oil immersion, all of which are in use today. In 1878 Koch opposed Naegeli and Buchner, who had claimed that bacteria could change types, one into another. Koch insisted that every microorganism had a certain shape, size, and special growing characteristics.

In 1881 came a far-reaching advance by Koch, the introduction of solid culture media by which pure cultures could be obtained. This step alone, which enabled Koch and his co-workers to discover the micro-

organisms of numerous diseases such as those of wound-infections, tuberculosis, cholera, typhoid and diphtheria, would entitle Koch to be considered the father of bacteriology. Potatoes and gelatine had been used before, but not as Koch employed gelatine to develop single pure colonies from mixtures of bacteria. It is related that his wife had called attention to different pure colonies of moulds developing on bread, and this observation prompted the idea. The publication of this work, "Zur Untersuchung von pathogenen Organismen," was the first result of Koch's removal to Berlin as director of the Kaiserlichen Gesundheitsamt (Imperial Health Institute). The work was demonstrated at the International Congress of Medicine in London, the same year, and the discoveries astonished the world. Pasteur, who was present, exclaimed: "It is a remarkable progress."

Wie fruchtbar ist der kleinste Kreis,
Wenn man ihn wohl zu pflegen weiss!
GOETHE

Gaffky and Löffler worked on either side of Koch in the Berlin laboratory at this time and later recalled their enthusiasm and astonishment as the discoveries fell like ripe fruit. Students of hygiene were in attendance and Koch having, as his biographer Wezel states, a practical mind, diverted his attention to originating methods of disinfection. He is credited with steam-sterilization, which he found would kill spores when dry heat might fail to do so. He tested carbolic acid in respect to its spore-killing powers, and introduced bichloride of mercury as the most powerful antiseptic. On March 24, 1882, Koch announced before the Berlin Physiological Society the discovery of the tubercle bacillus.

Ehrlich has ably described this occasion: "It was in a small room of the Physiological Institute that Koch in plain and clear words proclaimed with convincing power and with the demonstration of countless preparations, and evidences of proof, the etiology of tuberculosis. Everyone who attended this meeting was astounded and I must say that evening stands in my memory as my greatest scientific experience." The master had placed himself with the immortals.

We may recall Goethe's poem, "The Godlike":

Man, and man only
Can do the impossible; . . .
He and he only . . .
Can heal and can save; . . .
And we pay homage
To the immortals.

Bayle (1774-1816) had described the gray tubercle. Laënnec (1781-1826) had established the unity of tuberculosis. But neither had actually suspected that the tubercle was due to an infective organism. Villemin, in 1865, had proved that tuberculosis could be conveyed from one animal to another, and Cohnheim, in 1880, had infected the eyes of animals with tuberculous material. Of this demonstration it is said that Weigert wittily remarked "in oculo ad oculos."

Using osmic acid to fix the tissues, Hansen, in 1873, had seen little rods in the nodes of leprosy and claimed they were organisms which caused this disease. Hansen saw the leprosy bacilli unstained and noted their peculiar behavior with dyes. The *lepra* bacillus has been shown to be closely related to the tubercle bacillus.

Koch described his discovery in these words:

I began my investigations with objects in which the infectious organism would

surely be expected, as for example in fresh growing gray tubercles from the lungs of animals which had died three to four weeks after infection. From such lungs, hardened in alcohol, sections were prepared and for the proof of bacteria, the usual methods were employed. Also gray tubercles were crushed, spread on cover glasses, dried and tested for the presence of microorganisms. Efforts to find other microorganisms in these preparations were unavailing.

It will be noted that Koch first saw the tubercle bacillus in tissues and not in sputa. But Koch detected these bacilli in all his preparations of tuberculous tissue, even in the "solitary tubercle" of the brain. What must have been the thoughts of Virchow, who was present, who could not accept the new era, and who had contended that scrofula (tuberculous adenitis) and consumption were different diseases?

It was necessary for Koch to borrow from the work of his predecessors and it is unfortunate that in his perfect presentation he did not credit Weigert for the tissue-stain method, by which he first saw the tubercle bacillus, or Tyndall for the use of his culture medium on which Koch first grew the tubercle bacillus.

Friedrich Löffler, to whom we owe, with Klebs, the discovery of the diphtheria bacillus, was an assistant at the Imperial Health Bureau when Koch arrived. We are indebted to Löffler for numerous interesting incidents concerning Koch's discovery of the tubercle bacillus which he gave in a paper published March 21, 1907, as a tribute on the occasion of the twenty-fifth anniversary of this discovery. We are told that Koch kept aloof from the medical circles of Berlin largely on account of the potentate Virchow.

The scientific life at the Physiological Institute under du Bois-Reymond had reached a high level and the discussions over new discoveries were most inspiring. Löffler helped Koch in his decision to present his paper, which was then entitled "Ueber Tuberkulose," before the Physiological Society and the more so because the first volume of the transactions of the Kaiserliche Gesundheitsamt had met violent opposition from the Virchow school. The paper "Ueber Tuberkulose," which later became "Die Aetiologie der Tuberkulose" was read slowly and in a faltering manner, Koch not having yet attained convincing powers of delivery. Löffler described the paper as simple, clear, logical and of pure gold. The demonstrations were convincing. Yet when Koch finished there was no storm of approval and while the audience was astounded there was no applause. Löffler relates interesting sidelights on Koch's great discovery which again reveal his dogged persistence.

The crushed gray tubercles were at first stained by the slow process of Ehrlich's with a weak solution of methylene blue.

Koch noticed in his preparations fine slender rods, twice as long, and of about the same thickness, as the bacilli of mouse septicemia. With his zeal for microphotography difficulty was encountered in reproducing pictures of these slender rods. A brown color could be photographed better than blue and it occurred to Koch to use Weigert's method of Bismarck brown. The latter stain displaced the blue in the tissues and Koch was amazed to see the little blue rods standing out clearly against the brown counterstain of the tissues. He knew of no other germs which behaved in

this way, and this new discovery was accidentally brought about by his photographic needs. But another difficulty was to tax this resourceful genius. After showing these bacilli in numerous tuberculous tissues and sections, Koch suddenly discovered that he could no longer find the slender blue-stained rods. Every part of his technique had to be thoroughly questioned. The only difference had been that the methylene blue solution long standing in the laboratory had given out. A new solution has been prepared and this failed to stain the bacilli. What could be the difference between the old and new solutions of methylene blue? After numerous experiments Koch determined that the ammonia present in the laboratory air had been absorbed and had rendered the old methylene blue solution slightly alkaline. He found that by adding small amounts of alkali to Ehrlich's weak methylene blue solution he could again stain the tubercle bacilli.

Unlike most bacteria the tubercle bacillus is of slow growth. Koch had been accustomed to bacteria growing into colonies almost over night on the media employed. But he knew from his own inoculation experiments, and those of others, that tuberculosis was slow in development and inoculation with tubercle virus did not kill animals overnight as, for instance, anthrax and septicemia would kill mice. One can picture Koch using his magnifying glass day by day on his tubes containing Tyndall's medium, and his delight at seeing colonies of tubercle bacilli developing before the end of the first week. Without this habit, from his boyhood botanical days, of employing the magnifying glass, Koch might have become discouraged and have discarded his culture tubes, as, to the

naked eye, the colonies would not have been seen until at least the second week of growth. Koch's discovery of spores in the anthrax bacillus led him to the one error in his perfect paper on "The Etiology of Tuberculosis." He thought the little dots seen in stained tubercle bacilli were spores and he stated that individual bacilli contained from two to four spores.

For the first time in the history of diseases Koch proved in this work on the discovery of the tubercle bacillus, that a specific microorganism caused a specific disease, that this microorganism could be cultivated from the diseased tissues in pure form and could be inoculated into animals, producing the same disease, and be again recovered.

Observation, made aright,
Floods at first the soul with light;
Then if this be outward turned
Thou hast glorious wisdom learned.

GOETHE

Ehrlich said that no one had any doubt that the cause of tuberculosis had been announced on March 24, 1882, and all believed that a new era of medicine had been entered.

In 1884, Koch published a second most exhaustive paper on "The Etiology of Tuberculosis." In the introduction he states that he had to limit his first paper, in 1882, to the most important points. He now credits the work of others which he had borrowed in making his original discovery of the tubercle bacillus. The work is most complete, dealing with tuberculosis in many organs and in different animals. Koch again calls attention to spontaneous tuberculosis in guinea pigs which had been exposed to tuberculous laboratory animals.

At the tenth International Medical Congress held in Berlin in 1890, Koch

read a paper "Concerning Bacteriological Investigation." In this paper he announces what may be termed postulates of treatment. First a substance must be found which can inhibit the growth of tubercle bacilli in cultures, then this must be tested on tuberculous animals, and lastly on man. He had found cyanide of gold the most potent substance in restraining the growth of tubercle bacilli in cultures but its application to tuberculous animals had been without benefit. Unfortunately in this paper, Koch makes the one great error of his career. He claims he has found a substance which is harmless for guinea pigs but which injected into guinea pigs with advanced tuberculosis brought about a complete cure. A paper soon follows entitled "Weitere Mitteilungen über ein Heilmittel gegen Tuberkulose." In this paper Koch claims his new discovery as a certain cure for early pulmonary tuberculosis. Nothing is related concerning the nature of the product in these two publications. It is simply "ein Mittel." The "Mittel" for a time was known as "Koch's lymph."

I was a medical student at this time and can well recall the excitement produced in the world and the hopes aroused in consumptive patients. Had Pasteur been vindictive what an occasion for criticism! Koch in still a third paper relates what his substance is and how he came to discover it. As we well know today the substance was tuberculin. Koch had noted that a tuberculous guinea pig responded to a second inoculation of living tubercle bacilli in a different manner from that of the first inoculation. The site of the first injection never healed and the animal went on to death. The site of the second injection healed promptly

and according to Koch the animal improved in health. This is now known as the "Koch phenomenon" and is the basis of all our knowledge of tuberculosis immunity and the foundation of what is today termed "allergy."

Tuberculin was a product of dead tubercle bacilli and with his dogged nature Koch perfected several types of tuberculin, spending a great part of his life in the expectation that it would prove the cure for tuberculosis. That tuberculin would be of help as a diagnostic agent, Koch saw from his first experiments. Ten years later Koch was still fighting for his tuberculin cure and claimed that physicians who termed it useless and dangerous had employed the remedy in cases which were not those of pure tuberculosis but cases contaminated with purulent processes.

His conviction that he had found the cure for tuberculosis and his persistence in bringing out new tuberculins would seem to negative the idea, which has been advanced, that pressure had been brought to bear on Koch which resulted in a premature announcement of his cure.

Here again there may be drawn a parallel between Koch and Goethe. The poet also made one great scientific error in his career, to wit, his attempt to overthrow the Newtonian theory of light. And like Koch he spent years trying to prove his point. Koch's contentions about tuberculin rested on a more reasonable foundation than did Goethe's upon light, however, and are more easily understood. Nevertheless, just as Koch made many valuable discoveries in respect to tuberculin even though he could not prove his main thesis, so Goethe made considerable contributions to optics, opening up paths of speculation for

physicists, even though the world has never accepted his theory.

Fair Nature's Genius by the hand
Shall lead thee on through every land,
Teach thee each different life to scan
Show thee the wonderous ways of man.

GOETHE

At last Koch's *Wanderlust* was to be gratified. Part of the years 1883 and 1884 were spent in Egypt and India. As head of the German Cholera Commission, Koch, on February 4, 1884, sent the news from India to Berlin that he had found the "comma bacillus" and believed it to be the cause of cholera. At that time he had not been able to infect animals with this bacillus so that he had not been able to fulfill his own four postulates. Later however this was done in guinea pigs. Visiting Egypt, Koch soon discovered the bacillus which produced Egyptian ophthalmia.

In 1891, the Institute of Infectious Diseases was created in Berlin and Koch was appointed director.

As a result of his work in cholera, Koch, in 1893, pointed out the relationship between certain epidemics and water supplies. Water-borne epidemics could be controlled by filtration. Some years later Koch established our present hygienic methods for the control of typhoid.

South Africa was suffering from uncontrollable outbreaks of Rinderpest, so, in 1896, the British government sought the services of Koch. Here again was another chance to see the world and Koch worked out, in Africa, a method of immunization which proved successful. At the same time he studied Texas fever, tropical malaria, or black-water fever, sura and, later, the bubonic plague.

At the International Congress on

Tuberculosis in London in 1900, Koch started a far-reaching argument, namely that the human and bovine

In 1902, Koch was sent to German East Africa to study Rhodesian red-water fever and the opportunity was



FIG. 2. KOCH TAKING THE BLOOD FROM A CROCODILE FOR HIS STUDY OF SLEEPING SICKNESS.

tubercle bacilli were not the same, and that little was to be feared in man from the bovine tubercle bacillus. Villemin, in his discovery of the transmissibility of tuberculosis, in 1865, had noted a difference in the behavior of the two strains. Theobald Smith, a former president of the National Tuberculosis Association, had also called attention to differences between the human and bovine types of tubercle bacilli. The statement of Koch resulted in the appointment of a British Royal Commission which, after years of work, showed that the bovine tubercle bacillus was dangerous to man, although it was the human type which was most to be feared.

taken to study horse-sickness, recurrent fever and trypanosomiasis.

In 1905, Koch was awarded the Nobel Prize for distinguished service to medicine, and immediately took charge of the Sleeping Sickness Commission in German East Africa. This expedition lasted eighteen months and Koch introduced atoxyl as a remedy for the disease.

On his return Koch delivered before the Deutsche Kolonialgesellschaft an address which vividly portrayed his tropical experiences. The natives among whom he had worked existed chiefly on bananas and about 400 trees would maintain a family for a year. The bananas were cut before they

ripened and were stewed to a mush. The children ate so much of this banana mush, in order to satisfy their

develop in a person bitten, for weeks, months or even years. Many patients developed a maniacal excitement and



FIG. 3. KOCH ON A VISIT IN IOWA. STANDING: ADOLPH KOCH, MRS. ROBERT KOCH, HENRY KOCH, DR ROBERT KOCH. SEATED: MRS. ADOLPH KOCH.

need of nourishment, that they developed the banana-belly.

It was necessary to study the life history of the *Glossina palpalis* and their habits. The glossina, or tsetse fly, which infected man with sleeping-sickness, lived exclusively on blood, and a long quest was necessary to find out what kind of blood. This was the important question to the expedition. The contents of the stomachs of a thousand glossinae were examined before it was determined that they fed on crocodile blood. Stalking crocodiles, when visiting their nests, gave Koch plenty of thrills, but the trypanosomes, which could cause sleeping-sickness, were not found in their blood. Sleeping-sickness might not

the natives protected themselves by attaching a slave-fork to the victim. When the natives found that Koch had found a remedy for sleeping-sickness they came in such masses for treatment that it was necessary for the commission to build a stockade around their camping place.

In 1908, Koch came to the United States to visit his brothers, one of whom had become a farmer in Iowa. But this was only in passing, as his desire was to visit Japan and return to this country for the International Congress on Tuberculosis in the fall of the year. In the Hawaiian Islands Koch visited the lepers at Molokai and then proceeded to Japan, which he had heard was the finest and most interest-

ing of countries. Here his former pupil, Kitasato, awaited him and Koch was in no way disappointed. He was feted, a temple was built in his honor, and what delighted him most, he was taken on a fishing trip of an unusual kind by Kitasato. On a boat on the Ayu-Nagara river a fisherman had attached to his hand, by lines, five cormorant-like birds. The birds would plunge into the water and guzzle as many fish as they could. They were then pulled back into the boat and throttled until they disgorged the fish. Kitasato had told Koch of this method of fishing, in Berlin, but Koch would not believe it. He was now so overjoyed that he picked up the trout-like fish from the bottom of the boat, threw them in the river and saw the birds catch again the same fish, clapping his hands in his enthusiasm.

It was unfortunate that on his return to the meeting of the International Congress on Tuberculosis in Washington, in September, Koch could not have had similar entertainment. In letters written after this meeting Koch complained of the too frequent lunches and dinners and of the too strenuous activity. At this time it was my good fortune to meet Koch. Preceding the Congress, the City of Philadelphia entertained him at a banquet, and, it was rumored, at the cost of ten dollars a plate! A large number were present and an introduction was given me to Koch by Dr. Arnold Klebs. The latter related to Koch some work we had done on developing immunity against tuberculosis by inoculation of increasing numbers of tubercle bacilli, beginning with one tubercle bacillus. Koch immediately told me that such work could not be done. No one could isolate a single tubercle bacillus! I replied that

we had employed a technique evolved by Barber for the isolation of single yeast cells and that we had started with work on anthrax. "That might be possible," said Koch, "but a single tubercle bacillus could not be isolated." Timidly I replied, "But, Your Excellency, we have isolated a single Pfeifer (influenza) bacillus." Koch would have none of it. Klebs feeling that the presentation of our work in Washington might receive a serious set-back with Koch in such an attitude of mind, it was decided to send for Professor Barber and have him demonstrate the technique he had so cleverly originated. This was done and Koch expressed himself as convinced.

Accompanying Koch was a new wife whose appearance suggested the stage. The second wife had been divorced and Koch had fallen into disgrace, receiving a cold shoulder in Berlin; and his former friends in Clausthal had demolished the tablet they had placed in pride on his boyhood home. As Trudeau amusingly said of the new marriage: "You could not blame Koch, but what on earth could this young woman see in him?"

Such incidents as this indicate human frailty, which is common to all, and which in no way lessens the scientific stature of the man or the debt of humanity to his discoveries. If we tend to think of the more imaginative method of Goethe and Pasteur as representing a higher form of intellectual activity, we must remember that the method of Koch is a no less necessary one. If we instinctively think of Maxwell and Einstein as Goethean in the extent and power of their concepts, we can still compare Koch to men whose impress upon knowledge has been equally great. It was a

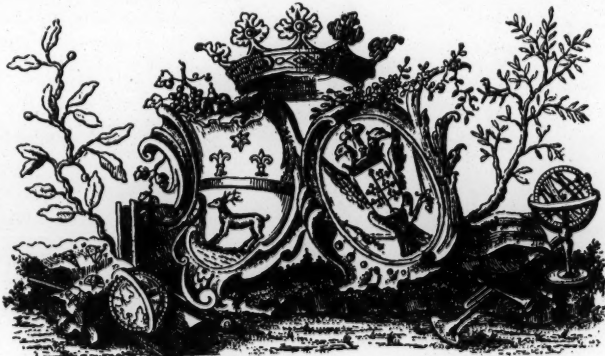
"dogged-does-it" man who established the theory of evolution; and the great Faraday, no less than Darwin, belonged to this school. We need both kinds, and we can do without neither.

Koch had written his daughter from Africa, in 1903, that although then sixty years of age he felt well and was still tireless. But he noted a shortness of breath and was suspicious of begin-

ning arteriosclerosis. Seven years later Koch developed an edema of the lungs, was taken to Baden Baden, and at 7 P.M. on May 27, 1910, his physician found him seated in his chair on the balcony—dead. The prodigious worker had passed away in peace.

Hushed is the harp, its music sunk in slumbers;
Memory alone can waken now its numbers.

GOETHE



Cimarolli Insculpsit et Sculp.

[From Redi: Opere. Napoli, 1778.]

KOCH'S VIEWS ON THE STABILITY OF SPECIES AMONG BACTERIA*

By THEOBALD SMITH, M.D.

PRINCETON, N. J.

THIS anniversary is not the occasion for a scientific disquisition but rather an attempt to place ourselves back fifty years into the hall of the Physiological Society in Berlin and try to share the sensations of an audience before whom was placed for the first time the unquestioned, actually living microorganism that for untold periods had been playing havoc with the human race and its indispensable domestic animals. Here was the bacillus in the tissues brought out by a special stain, here was the delicate growth of the organism on a special medium free from all other organisms, and here were tissues and cultures from animals inoculated with the pure growth. We can almost hear the speaker without unnecessary words in clear, crisp, easily understood sentences describe in a critical attitude towards his own methods the difficulties he had to overcome and the results attained. He does not try to deflate his predecessors but states briefly their contribution to his problem. Nothing like this had been presented to a medical audience before. The demonstration must have been overwhelming to various groups present as well as to the wider circle of readers of his address. Among those groups we may, I think, pick out:

1. Those neutrals who were groping after some substantial and accurate data on the then much discussed germ-theory of disease.

2. Those who failed to recognize genius in a country doctor without university affiliations and now only a *Regierungsrat* and worker in the still embryonic Imperial Health Office.

3. Those physicians whose theories and daily efforts had been based on the belief that in view of localized and family groups of tuberculosis it was an inherited disease.

4. The followers of Naegeli, the Munich professor of botany, who represented the theory of indiscriminate transformation of bacteria from harmless to pathogenic and the reverse.

5. After the announcement by Koch, another group appeared in course of time who either denied the primary etiological significance of the bacillus as described or failed to apply the proper technique and could not find the bacilli. All these who had published their objections Koch answers in a publication in 1883. He does not conceal his scorn over their incapacity. Among those thus answered were both Europeans and Americans. In the former groups was Dettweiler. In the latter were Schmidt of Chicago, Sternberg, and Formad.

Discussion of the germ theory of disease, so-called, was fairly active in Koch's time, and as is quite natural, the fewer the uncontrovertible facts, the greater the volume and area of discussion. If we limit ourselves to those students of microbic and mould life whom Koch deigned to call to order in his published papers, we can get a fair picture of what he had to

* Read before the Historical Section, College of Physicians of Phila., Mar. 14, 1932.

overcome to create an entering wedge for his new bacteriology. The group that gave most trouble and furnished most opposition to the exacting demands of Koch's methods of logic and technique was the Munich school headed by the botanist Naegeli. Naegeli had published a book in 1877 on the lower fungi in their relation to infectious diseases. In a preface consisting of seventy-eight paragraphs, Naegeli summarizes the contents of his book. In it he builds a system of bacteriology and on it a complete scheme of preventive medicine and sanitation, the whole obviously constructed on the microscopic examination of mixed and impure cultures of moulds and bacteria. Concerning the morphology of bacteria he writes:

We must consider a micrococcus form, a bacterium form, a vibrio and a spirillum form, but we must not overlook the fact that the objects corresponding to these conceptions are inconstant [*wenig constant*] and continually lose themselves in one another . . . The same organism in milk produces lactic acid, in meat putrefaction, in wine *Gummi* and in earth no fermentations, and finally in the body to take part in some disease . . . As every communicable, infectious disease has arisen spontaneously, it must continuously arise anew under similar circumstances. The miasmatic contagious diseases have an endemic distribution area where with the simple cooperation of soil bacteria they are produced anew.

He goes on to state that the miasmatic contagious diseases are produced by two types of bacteria, soil and disease bacteria. The soil bacteria modify the chemical constituents of the body fluids and favor the disease bacteria. This was known as the diblastic theory. According to him, it is a general phenomenon that a substance

must first be changed by one (*Pilz*) mould before another can multiply.

The transformation doctrine was convenient to clear up difficulties. Why go to all the trouble introduced by Koch's methods? The *status quo* was quite satisfactory. This is not an unusual point of view. We all indulge in it at times in neglecting to follow up the little annoying variations and departures from assumed expectations. The generations to follow us may point their fingers at us for regarding certain small details as too trivial for consideration. What difference did it make whether a spore was in the middle or at one end of a rod? If a vibrio and a bacillus appeared together in a culture, it showed that form species had no significance. Under the influence of Naegeli's doctrine, Hans Buchner was able to transform the anthrax into the hay bacillus by repeated culturing under special conditions. Koch's strictures on Buchner's performance remind one of first lessons in bacteriological technique.

In reviewing Naegeli's book in 1878, Koch says:

It is an attempt, brilliantly carried out, as was to be expected of Naegeli, to bring light, along theoretical lines, into a large dark territory, into which up to the present only a few short paths enter. The undertaking is premature, because the available facts are as yet too few for the establishment of a safe theory. The failure of this attempt, which has been preceded by other equally unsuccessful attempts (pro and contra germ theory), is however a renewed warning to search untiringly for more data which may clear up the relation between bacteria and infectious diseases and to leave the theoretical solution of the problem to a later period which will have at its disposal sufficient data.

Even as late as 1881, Grawitz wrote that *Aspergillus glaucus* became pathogenic when cultured at 39°C. and passed successively through animals. Gaffky, set to work by Koch, showed that *Aspergillus* was pathogenic without the preliminary adaptation to 39°C. Grawitz retorted by stating that if any one could culture the mould at 10°–20°C. he would consider himself beaten. Gaffky also accomplished this. Grawitz had taken no precautions against contaminations, for he stated later that he used pure cultures only for definite purposes and that in the controversial case any reason for pure cultures had not been in evidence.

It may be well to state that previous to the announcement of the discovery of the tubercle bacillus in 1882, Koch's original paper on anthrax had been before the world since 1876. He had also at that time published a paper on technique and excellent photomicrographs of bacteria. His study of septic infections in small animals had appeared in 1878. His second paper on anthrax and his description of methods in the study of pathogenic microorganisms, as well as the extensive studies on disinfection, appeared in 1881. It is of interest to note here that A. Neisser had succeeded in staining the bacillus of leprosy in 1879. If any one incident might have given Koch a hint of what he was to look for in tuberculosis, it seems to me that it was this event.

Max Kirchner in his brief account of Koch's life mentions the winter of 1881–2 as the time when Koch did the work on tuberculosis. When we survey the material which passed through his hands, it seems more reasonable to assume that he really finished his work during this time and that he must have done much pre-

liminary to this period of intensive work. Anyone who has worked with tuberculosis and the bacillus is aware of the long periods of waiting for cultures and animal inoculations to mature. In this first paper he examined histologically for tubercle bacilli material from thirty-three human and eighteen animal cases as well as several hundred inoculated laboratory animals. He carried on thirteen experiments with pure cultures on small animals. Each experiment comprised a small group of animals. In the two years following the first announcement, at the end of which his final monograph of nearly a hundred quarto pages was published, he had materially increased the amount of material studied. Thus he reports on the examination of 113 cases of all forms of human tuberculosis for tubercle bacilli, on thirty-three animals of different species, among them fifteen bovines, and on twenty-five spontaneous cases in seventeen guinea pigs and eight rabbits. He had now obtained forty-two strains of tubercle bacilli, one half directly from the material, the other half through guinea pigs. Twenty-eight animals had been inoculated with diseased tissues and twenty-six inoculation experiments with pure cultures on small groups of laboratory animals had been carried out. The method of staining tubercle bacilli described in the first paper had been improved with the aid of Ehrlich and the acid-fast character of the bacillus demonstrated. The subsequent introduction of carbol-fuchsin gave the staining a permanency not obtainable with the aniline water gentian violet.

The discovery and culture of the tubercle bacillus derives its high importance and value from the fact that

it brought directly into the vision of contemporary medicine a form suspected and perhaps seen but not definitely grasped by a few precursors. It took out of the hands of pathology and clinical medicine the prerogative of diagnosis and placed it on a definite etiological basis in the hands of the new medical bacteriology. Fortunately the specific staining process, the acid-fastness, gave the diagnosis such assurance that in the demonstration of tubercle bacilli in pathological products and tissues it outstripped all subsequent etiological discoveries in this respect. Koch's own evaluation of his discovery was on a very modest level. Towards the end of his monograph he tells us that,

The etiology of tuberculosis as it has been developed on the basis of our knowledge of the tubercle bacillus offers in particular scarcely anything new. Before the discovery of the tubercle bacillus Cohnheim had already considered tuberculosis as an infectious disease and accordingly formulated its etiology. In this direction my investigations have not brought to science any material progress and yet it must be regarded as a gain that the most important question of the infectiousness of tuberculosis, which hitherto had been questioned by most [observers] has now been buttressed with such evidence that objections are no longer admissible.

Looking at the tubercle bacillus with modern eyes the reader is struck by Koch's repeated insistence on the existence of spores in tubercle bacilli. We know that no tissue products of the disease, no tuberculous milk, no cultures resist 60°-62°C. Any spores therefore would be essentially different from those of anthrax, tetanus, and the like. Since the breaking-up of bacilli under inhibitory conditions of

growth into series of short acid-fast segments is well known and frequently seen, this may account for Koch's spores. These segments are probably the same as Much's granules. In insisting on spores, Koch shows the influence of earlier work with anthrax. He reasons that anthrax bacilli being saprophytic earth inhabitants must leave the body to sporulate. On the other hand tubercle bacilli being obligatory parasites must sporulate without leaving the host. This reasoning has not been sustained. Spores have not been demonstrated with any pathogenic organisms which are transferred directly from host to host, nor is there any evidence of heat resistance.

His discussion of wandering cells and giant cells and their relation to the multiplication and destruction of tubercle bacilli presents nearly all the questions which have agitated pathologists up to the present. Injecting large numbers of tubercle bacilli into the circulation, he finds cells containing tubercle bacilli. These cells may or may not become giant cells later on. He leaves this question to the future. The bacilli in giant cells usually are few in number but occasionally they become numerous. His discussion opens the problem of phagocytosis in which either the cell or the contained bacilli dominate. Caseation he insists follows the presence and multiplication of tubercle bacilli but he leaves the interpretation of the process to pathologists. He only insists that, contrary to current concepts, caseation follows the bacillus and does not precede and prepare the soil for it.

In the early days of the modern bacteriology as ushered in by Koch's methods, the culture of pathogenic bacteria and their maintenance in the

laboratory as tools with which to explore, extend, and limit the research problems were in their infancy. The pus bacteria, such as streptococci and staphylococci, the anthrax and mouse septicemia bacilli, and now the tubercle bacilli were in hand. Koch emphasizes the persistence in virulence of tubercle bacilli but he could not have had under observation strains older than three years. Had he been in position to test strains ten to thirty years under cultivation he would have found a gradual decline to extinction of virulence in the older strains.

As is well known, Koch regarded the acid-fast bacilli of bovine, human, and avian disease as one race or species. His inclusion of avian bacilli might indicate some obtuseness on his part had he not explained in detail later how it happened.¹ In his original monograph he had examined only microscopically tubercular tissues of fowls. Neither cultures nor inoculations had been made. When later he received such cultures from others and compared them with strains which he himself isolated from fowls, he discovered his error in failing to heed his own warning that all available characters of microorganisms must coincide to bring strains together as identical. His position in regard to the relationship between human and bovine strains was that they were identical. His general position on this question of apparently identical bacteria in different hosts was defined as follows:

Though the symptoms of tuberculosis in individual species may be different and though it is difficult to regard human phthisis and inoculation tuberculosis of

guinea pigs as the same disease, yet there are transition forms between these extremes, partly in the same species, still more in other species, which cause the apparent gap to disappear. But the complete unity and relation of the tuberculosis processes of different animal species force themselves unconditionally [*unabweisbar*] on us when we hold to the primary structure of the tubercle. Should, however, it occur that in the course of further investigations a difference between human and bovine bacilli appears which compels us to regard them as near relatives but different species, we would nevertheless have every reason to regard the bovine bacilli as highly suspicious.

He urges hygiene and preventive measures as essential until it is proven that human beings can ingest and inhale bovine tubercle bacilli and bring them in contact with wounds without deleterious effect.

No further statements were made by him on this subject after 1884 as he had other tasks before him, notably the Asiatic cholera problem. In a visit to Berlin in 1896, I called his attention to my early results in differentiating bovine and human tubercle bacilli. The suggestion given he acknowledges in his address² before the International Tuberculosis Congress held in Washington in 1908. His stand as expressed at the International Congress in London in 1901 is well known. He went too far in asserting for the bovine disease only a negligible influence on human tuberculosis.

In this brief statement it becomes clear that Koch had covered the ground so thoroughly that little of any significance calculated to modify our view has been brought to light since 1884. The attempts to add to this

¹ *Verhandl. des X. internat. med. Kongresses*, Berlin, 1890.

² *J. A. M. A.*, 51: 1256, 1908.

stock of information, such as the efforts to demonstrate a filterable state, are highly controversial. The excellent work done with certain *Bausteine* of the tubercle bacillus in recent years by Dr. Sabin and associates will be of material aid in the endeavor to penetrate the engrossing mystery of the tubercle itself which represents the interaction of two living organisms, each subject to endless variations.

In training his guns continually against the bacteriological superstitions of his day, Koch naturally became to a certain degree a victim of the recoil in going too far in insisting on the stability of form and function among bacteria. There is nothing in the publications of Koch and his associates to remind one of the plasticity of microorganisms within certain limits. In the early days of modern bacteriology, those of us not under the immediate influence of Koch and his school were continually finding variants among pathogenic bacteria. Even strains of tubercle bacilli have a way of differing among themselves in growth characters and virulence that comes very near bridging the gap between human and bovine types. Today, the existence of variants in all pathogenic microorganisms is definitely established. Yet Koch was not a special creation apostle, for he writes in his monograph (1884): "We can not think otherwise than that the tubercle bacilli at some time were developed out of other bacteria. After they became genuine parasites, they appear to have had in common with other parasites the peculiarity of retaining their characters with great tenacity."

Koch possessed the characters of the pioneer naturalist as well as those

of the modern experimenter. His naturalist tendencies came out in his early life in his love of nature and his local studies of fauna and flora, and later in his adventurous trips to India, to South and Central Africa. He knew no fear. His qualities as an accurate experimenter were displayed when still in practice in Wollstein. Here he began to develop his culture methods and did some fine pioneer work in photomicrography. To meet all objections which might be leveled against his etiological researches, his rigorous logic and high standards of accuracy brought forth four requirements for the demonstration of any etiological relationship which have found their way into all textbooks and which if carried out leave no loop holes. They are known as Koch's rules. 1. We must demonstrate the microorganisms in the diseased tissues. 2. We must isolate and culture them free from all other living organisms. 3. We must reproduce the disease with the pure cultures. 4. We must isolate the injected organisms in pure culture. Unfortunately only a few infectious diseases can be subjected to this complete regimen. Among filterable virus diseases, for instance, the multiplication of the virus in tissue cultures does not meet the rigid requirements, for only sterilization of the tissues can make it absolutely certain that other living organisms are not introduced. However, the high degree of probability established by those requirements that can be rigorously carried out gives us assurance and leaves just enough uncertainty to make future generations think it worth while to bring the methods to a still higher state of accuracy. The Koch rules have undoubtedly exercised a very sobering influence on

many enthusiastic bacteriologists during the past half century, and in spite of their rigidity have been the best introduction conceivable to modern bacteriology in the days of Naegeli, Hallier, and Buchner.

Aside from his special contributions Koch's early work marked the beginnings and furnished the foundations of modern scientific bacteriology—the natural history of pathogenic bacteria. Though the experimental method was intimately concerned, its chief function was to produce pure cultures for morphological, systematic, and ecological study. The vastly more complex physiological problem of their relationship to the host and its tissues came incidentally in a disclosure of humoral and cellular forces in their relation to infection and immunity and it still awaits more comprehensive as well as analytic study. Since we must

know what we are working with all such more penetrating analyses must be prefaced by Koch's methods. They are here to stay and cannot be discarded, since nature does not deal primarily in pure cultures.

We are passing now through a period as interesting as that associated with Koch's early career. Almost overnight the field of filterable agents of disease has become very extensive. Bacteriologists, tired of considering their wards simply as elongating and dividing, tacitly abandoning the conception that these schizomycetes are the non-sexual residues of higher forms, are building another hypothesis with bacteria forming the brood sacs and germ centers of invisible, filterable forms. We have in our midst either a group of modern Kochs or disciples of Naegeli. Only the future will tell how to classify them.



THE RECEPTION OF KOCH'S DISCOVERY IN THE UNITED STATES*

By H. R. M. LANDIS, M.D.

PHILADELPHIA

WE meet tonight to take appropriate notice of a great discovery—the unmasking of the mystery of tuberculosis. It is not too much to say that no single discovery in disease has had a more wide-reaching influence. It, therefore, may be not amiss to tell the story of how and in what manner the news of this discovery was received in the United States.

Robert Koch's paper on "The Etiology of Tuberculosis" was read before the Physiological Society of Berlin on Friday, the 24th of March, 1882, and appeared in print in the *Berliner klinische Wochenschrift* Monday, April 10, 1882. The announcement of the discovery was made known to the English-speaking world in a somewhat unusual manner. A copy of his address was sent by Koch to the English scientist, John Tyndall, who at once recognized the "serious public import" of the communication and forthwith embodied its salient features in a letter to the *London Times* under date of Saturday, April 22, 1882. The following day, Sunday, April 23, 1882, the *New York World* contained a brief cable dispatch calling attention to Koch's discovery. This note was in turn copied by the *Public Ledger* of Philadelphia Monday, April 24, 1882.

Tyndall's letter appeared in full in the *New York Times* and the *New York Tribune* Wednesday, May 3, 1882, and both papers commented

editorially on the great importance of the matter set forth in Tyndall's letter. On Sunday, May 7, the *New York Times* contained an editorial which, in part, is as follows:

The public may justly complain of the slowness of the secular and scientific press to recognize the news item of the highly important result of Prof. Koch's discovery of the parasitical source of tubercular disease. Prof. Tyndall's letter to the *London Times* first made known to the English speaking world the facts stated in Doctor Koch's address delivered nearly a month earlier before the Physiological Society of Berlin. Yet it is safe to say that the little pamphlet which was left to find its way through the slow mails to the English scientist outweighed in importance and interest for the human race all the press dispatches which have flashed under the Channel since the date of the delivery of the address—March 24th. The progress and recovery of sundry royal goutis are given the wings of lightning; a lumbering mail-coach is swift enough for the news of one of the great scientific discoveries of the age. Similarly, the gifted gentlemen who daily sift out for the American public the pith and kernel of the Old World's news leave Dr. Koch and his bacillus to chance it in the ocean mails.

Friday, May 12, the *Public Ledger* of Philadelphia emphasized the importance of the discovery by calling attention to the large number of consumptive deaths that had occurred in this city during the three preceding years. Thus, among adult deaths, one-fourth were caused by

*Read before the Section on Medical History, College of Physicians of Phila., Mar. 14, 1932.

consumption. Sensing the lack of facilities then existing in the medical schools to deal with such problems, the *Public Ledger* urged the need for money to establish chairs of research in order that the scientific side of medicine might receive more attention.

The first medical recognition of Koch's discovery was a favorable editorial article (based on Tyndall's letter), April 29, 1882, in the *Medical News*, one of the leading weekly journals of its time. From then on there were numerous abstracts from the German journals, but it was not for some time that observations by Americans began to appear.

Looking back at this period we find that American medicine was illy equipped to deal with such problems. But few of the medical schools of that time made anything more than a pretense of teaching pathology, and bacteriology, then in its infancy, was hardly thought of. Such facilities as were offered were totally inadequate. The pathological department of one of the great schools of that day was described as a single, gloomy, and ill-smelling room with a meager equipment. With few exceptions those interested in the investigative side of medicine at that period practiced medicine as a vocation and pursued their scientific studies as an avocation.

The work of Pasteur, Lister, and a large group of German investigators had made it apparent to the better informed that medicine was entering upon a revolution in its conception of disease. Thus, in the decade preceding Koch's announcement, discoveries of the specific causes of diseases followed each other in rapid succession—the spirochete of relapsing fever, the lepra bacillus, the typhoid bacillus, the gonococcus, pneumococ-

cus, etc. It was not, however, until Koch made known his discovery of the tubercle bacillus that the medical profession in this country began to take an interest in the "infinitely little."

Naturally the first interest in Koch's paper was in the bacillus itself. The earlier medical meetings dealing with Koch's discovery, therefore, were concerned chiefly with describing the staining process and the demonstration of the stained organism. To the vast majority of physicians the demonstration of the tubercle bacillus under the microscope was their first introduction to the new science of bacteriology. It was something tangible, describable, and recognizable by its staining properties as easily as one individual is known from another. Furthermore, there was a greater appeal in the case of the tubercle bacillus than in any other organism recently discovered because it concerned a disease ever present and one which had justly earned the title, afterwards applied to it by Osler, of the "Captain of the Men of Death."

The original procedure for the staining of the bacillus was not the simple process it afterwards became. In the beginning the bacilli were stained with methylene blue for twenty-four hours at ordinary temperature or half an hour at a temperature of 40°C. and counter-stained with vesuvin. The latter stained everything brown except the tubercle bacilli which were thus thrown into relief, and retaining the blue stain differentiated them from other rod-shaped organisms. Later the process was modified as to time and staining reagents, carbol fuchsin being substituted for methylene blue by Ehrlich. Furthermore the examina-

tion for the stained bacilli was facilitated by the marked improvement in optical apparatus introduced by Abbé.

Dr. Trudeau's experience was probably typical of many others at this time. After spending days of discouragement in which he succeeded only in covering himself with the staining reagents and vainly looking for the stained organism through the unfamiliar microscope he was about to give up in despair; an inauspicious beginning for one who, under great difficulties, was later to be the first in this country to isolate the bacillus in pure culture from the sputum.

Doubtless many men throughout the country were examining the sputum of consumptive patients for the presence of tubercle bacilli in the year immediately following Koch's announcement. The first noteworthy contribution, however, was made by T. Mitchell Prudden, of New York, in April, 1883. Prudden confirmed the finding of the bacillus in the sputum of tuberculous patients and in the postmortem material of other forms of tuberculosis. He expressed the belief that as a practical measure, the results exceeded what the original report had led one to believe. In his opinion this procedure must be utilized from now on by every expert diagnostician.

Immediately following Koch's announcement Austin Flint, Sr., caused to be made the examination of the sputa of all patients in his medical service in the Bellevue Hospital. The results were published as an appendix to a reprinting of the 5th edition of his *Practice of Medicine* under the date of December, 1883. The technical part of this work was carried out by Flint's associate, William H. Welch, and by William H. Flint, and a young

house officer, Herman M. Biggs. Their conclusions are of great interest. They found that during the progress of the disease bacilli are rarely absent and their presence is positive proof of the existence of phthisis. The sputum should be examined in all patients as it will often furnish demonstrative proof when symptoms and physical signs are not conclusive.

A single negative examination is not to be relied upon as bacilli may be absent in some and present in other specimens.

Bacilli found in abundance on repeated examinations, at short intervals, denote an active progress of the disease, and, on the other hand, if comparatively few in number, it may be inferred that the disease is not actively progressing.

The absence of bacilli, repeated examinations having been made in a well-marked case of phthisis, may be taken as evidence that the tuberculous infection has become arrested, albeit some cough and expectoration continue. Under these conditions the patient is suffering from the lesions incident to the tuberculous disease, and the prospect of improvement or even recovery may be good notwithstanding that the lungs are considerably damaged.

As was to be expected, there was another side to the picture. Few great discoveries have ever had the good fortune to pass unchallenged. In this instance there were not wanting those who refused to believe, although they constituted a small minority. Chauvinism, too, had its fling; and there were a few who voiced their resentment at what they believed the too ready acceptance of the views of foreign *savants*.

The outstanding opponent of Koch's discovery was Henry F. Formad of Philadelphia, a pathologist and investigator of some note. Unfortunately, for himself, Formad had been working on the problem of tuberculosis for several years and had arrived at conclusions as to its causation which bore no resemblance whatever to those of Koch. Strong in his own beliefs, he attacked the reliability of Koch's observations and discredited the etiological significance of the tubercle bacillus.

Formad's conception of tuberculosis (October, 1882) was that it was due to an inherited or acquired predisposition, this predisposition consisting of certain tissue differences as compared to the normal or non-predisposed. It was because, and only because, of these tissue differences that one could become tuberculous. There was no need to invoke the intercurrent action of any bacterium. In building up his theory, Formad produced many remarkable statements. Let this one suffice as an example: "Every individual is liable to acquire syphilis, small-pox, and other contagious diseases, but it is proved that not every one can have tuberculosis. A special predisposition and a special individual are required. In such an individual, a simple inflammation resulting from any cause can produce tuberculosis." As further evidence that the tubercle bacillus was not the causative factor, he cited experiments in which he had produced tuberculosis in animals or tissues liable (predisposed) to the disease by means of powdered glass, sterilized glass, ultramarine blue, and other substances. From this he drew the conclusion that if substances other than the tubercle bacillus could produce the disease,

there must be a bacillary and a non-bacillary form of tuberculosis. But this could not be true inasmuch as the tubercle bacillus played no part in causing the disease. It might be present, it is true, in tissues affected by tubercular disease, these tissues furnishing a favorable nidus for its growth, and possibly in this way condition a fatal ending. In other words the disease may involve a parasite, but not be due to a parasite. This, as Flint pointed out, was opposed to the general laws observed in parasitic disease. If a parasite be proved to bear a causative relation to tuberculosis, it must be the cause *par excellence* though predisposing causes may exist and help. A year later (October, 1883) Formad conceded the diagnostic value of the tubercle bacillus but maintained, as vigorously as ever, his disbelief in its etiological significance and in the contagiousness of tuberculosis.

Formad's views presented October 18, 1882, six months after Koch's discovery became known, were, if not actively endorsed, not disputed by his listeners. As reported in one of the medical journals, the general tenor of the discussion was favorable to his theory. In a second lengthy communication, October, 1883, he greatly elaborated his ideas. At this point E. O. Shakespeare, of Philadelphia, made a bitter attack on Formad's theories both at medical meetings and in the medical journals. This controversy was referred to as the Philadelphia debate.

Sternberg also was doubtful of the reliability of Koch's observations probably because he failed in his attempts to repeat Koch's experiments. This was surprising as Sternberg was familiar with the development of the new science of bac-

teriology and only two years before had isolated the specific cause of croupous pneumonia, the pneumococcus.

What may be considered as the final act in the establishment of the true status of the tubercle bacillus in this country was the lengthy discussion that took place at the meeting of the American Medical Association in Washington, May, 1884. This was Formad's last stand.

If the best minds of the profession had little difficulty in accepting the tubercle bacillus as the cause of tuberculosis, most of them were wrecked on the rock of contagion.

As we briefly survey the situation prior to Koch's discovery, we find that the belief that tuberculosis was an infectious or contagious disease, as it was more often called, was an old one. Unfortunately these views on the contagiousness of the disease were allowed to fall into abeyance. The tendency to belittle the importance of contagion, strongly fixed in the minds of many, did not die away. There arose the belief in a special diathesis or a constitutional state that predestined certain individuals to death from tuberculosis. Heredity, predisposition, a scrofulous diathesis, etc., had become so ingrained in medical thought that they formed almost unsurmountable obstacles against the theory of contagion.

Villemin was the first to partially break through these barriers by showing that tuberculosis could be conveyed to animals, which, although receiving many verifications, also met with well-founded opposition. And the question of whether tuberculosis was an infectious disease still remained debatable. More headway was made by Cohnheim and Salomonson with their inoculation experiments into the

anterior chamber of the eye of rabbits, and later by the inhalation experiments of Tappenheimer and others. Thus the stage was set for the discovery of the final link in the chain of evidence.

Having settled the status of the tubercle bacillus as the causative factor, the question of the contagiousness of the disease became a live issue. As I have already pointed out, the minds of medical men were still befogged by the old and generally accepted belief that the important factor was an hereditary influence or a predisposition to the disease. From the very beginning men differed on the part played by personal contact in the transmission of the infection. In spite of this, however, the tide of the growing belief in the infectiousness of tuberculosis set in strongly following the publication of Koch's paper. Two schools of thought developed. First those who struggled to hold out against the new tendencies of thought which were springing up from the discovery and, second, those who leaned toward the theory of the infectiousness of the disease and pled for a fair hearing.

Koch's appraisal of the situation in Germany, was also true for this country. Many practical men, he said, had no doubt kept in mind the possibility of infection, but with the medical profession generally phthisis is regarded as the result of constitutional peculiarities rather than direct contagion.

The arguments used against the theory of contagion were several in number. Briefly they were as follows: (1) What is today considered as the strongest proof of the transmission of the disease from the sick to the well is that seen in family relationships. It was perfectly well known by medical

men of that period that tuberculosis often decimated entire families. And that there were not wanting instances in which the disease appeared in two or three successive generations. What was, therefore, the very strongest evidence in favor of contagion was disregarded because such instances pointed conclusively, in their minds, to an hereditary predisposition.

(2) Men of that time were further confused by the frequently cited evidence of the freedom from infection on the part of attendants and others about hospitals harboring consumptive patients. How, they argued, could it be transmissible if those caring for consumptives for long periods of time escaped infection?

(3) Marital infection and other instances of infection transmitted from one individual to another not a blood relative, and where the hereditary factor did not count, were explained on the basis of the great frequency of the disease and coincidence. It was inevitable, as Karl Pearson only a few years ago asserted, that because of the frequency of the disease, a man predestined to develop tuberculosis would not infrequently marry a woman similarly predestined. It was not at all a matter of one infecting the other.

(4) Could the meat of cattle suffering from tuberculosis produce the disease in human beings? If the disease were transmissible, it should, but there were quoted instances in which, because of its cheapness, people had eaten such meat, even in the raw state, according to habit, without suffering any ill effects. One writer with a strong bias rather implied that these people flourished on such a diet. Another was unwilling to sanction the eating of such meat, not

because of the danger of infection, but because it lacked the proper nutritive value.

(5) And finally phthisio-phobia was invoked. To brand tuberculosis as being contagious would increase the hardships of those suffering from the disease by causing them to be shunned by their fellow men.

Such was the clinical evidence against the transmission of the disease by means of a parasite. To reconcile this conception of tuberculosis with the new theory proved, for many, too difficult a task at that time. A few grasped the significance of Koch's work, many wavered not knowing which way to turn. Austin Flint, with more courage than most of his contemporaries, cut the Gordian Knot that had bound him to the theory of predisposition, by boldly asserting that if tuberculosis was caused by a parasite it was contagious and clinical facts must be explained in accordance with that view.

So long as the contagiousness of the disease remained a doubtful issue, preventive measures played a minor part in these early discussions. These early experiences did suggest to some, however, certain precautions. The sputum of consumptives should be disinfected. Furthermore, the knowledge that danger often lurks in the sputum made promiscuous spitting more than a breach of propriety; it now became a greater offence than a disgrace. And a handkerchief used for disposing the sputum might well prove a veritable Pandora's box of infection. Other preventive measures that suggested themselves were the separation of tuberculous patients from the non-tuberculous in hospital wards; interdiction of the occupancy of the same bed with a consumptive, and, if

possible, the same room at night. The freest ventilation of rooms was advocated.

Thus at the end of the first two years the diagnostic value of the tubercle bacillus and its rôle as the causative agent of tuberculosis were firmly established. A general acceptance of the contagiousness of the disease was still in the distance. For the most part men remained indifferent or skeptical, unable to throw off entirely the shackles of the hereditary factor. The practical application of preventive measures was not fully

understood although a start in the right direction had been made.

As we look back over these fifty years it is quite clear that Koch's prediction fell somewhat short of the mark. He felt that it would probably take two generations to bring about universal acceptance of the new ideas; namely, (1) the relationship between the tubercle bacillus and pulmonary tuberculosis, and (2) the preventive measures and regulations of public health which that relationship so forcibly indicated.



WILLIAM SHIPPEN, JUNIOR

By WILLIAM SHAINLINE MIDDLETON, M.D.

MADISON, WIS.

PART II, CONCLUSION*

The Revolution brought an abrupt interruption to the natural growth of the new Medical School, which measured its success by the soundness of its curriculum rather than by the number of its students. Indeed the dignity of its degree had by this time come to approach that of its mother institution, Edinburgh. The first break in the Philadelphia faculty came in October, 1775 with the election of Dr. John Morgan by Congress to take the place of the traitorous Benjamin Church as Director-General to the Military Hospitals and Physician-in-Chief. Morgan's efforts to bring harmony and order out of the chaotic state of the medical affairs of the Continental Army were met with distrust and open opposition. Washington's support was unswerving. On April 3, 1776 he wrote to Morgan from Cambridge, "Reposing entire confidence in your care, diligence, and zeal for the service, I remain satisfied of your best exertions for the public benefit." But the hospitals were overtaxed, the medical organization was loose and the supplies for the care of the sick and wounded were totally inadequate. Toner recounts the arrival of Drs. Warren and Shippen in Bethlehem on the evening of December 3, 1776, and their arrangements to place 250 patients in the Brethren's House. "The next morning they entered the settlement a pitiable spectacle to behold, totally destitute, gaunt and famishing." Their rations were delayed for three days and of their

number 110 died before the end of the winter. Thirty remained to be evacuated on March 29, 1777.

To add to Morgan's difficulties many forces were operating to arouse the popular unrest in details of the medical situation of the Army over which he had no control. A characteristic letter passed from William Shippen, Junior, to Richard Henry Lee, a member of the Continental Congress from Virginia, under date of December 17, 1776, from which the following abstract is taken:

From a tedious experience, I have learned what is necessary in a military hospital, and think it my duty to give my opinion thereon to my friends in Congress. I have attended to this matter more carefully because I saw on my first entering the army that many more brave Americans fell a sacrifice to neglect and iniquity in the medical department than fell by the sword of the enemy. I saw directors, but no direction; physicians and surgeons but too much about their business, and the care of the sick committed to young boys, in the character of mates, quite ignorant, and, as I am informed, hired at half price, etc. Some I found honestly doing the duty of their stations. How far my own department has been better filled does not become me to say, and I am not ashamed to own that I am conscious of many imperfections, but flatter myself that none of them have arisen from want of care and integrity in the director or skill and industry in his physicians, surgeons, and mates; all the latter, he can with pleasure declare, have done more than their duty cheerfully.

* Part I appeared in the September, 1932, issue of ANNALS OF MEDICAL HISTORY, pp. 440-452.

Some have arisen from my inexperience, some from the scarcity of many articles necessary for the sick, and some from the distracted, flying state of the army. All these causes, I persuade myself, will in a great measure be removed in the next campaign if our cruel enemies risk another.

Such a communication from a subordinate officer who had recently enquired about the etiquette of service was neither loyal to Morgan nor was it designed to establish confidence in his colleague's leadership. Shippen's original appointment as chief physician to the flying camp was dated July 15, 1776. The Journal of the Continental Congress for January 30, 1776 bears the record of William Shippen's first service. "Resolved, that Dr. Cadwalader and Dr. W. Shippen, Junr. be desired to inspect the room of the goal where General Prescott is confined, and enquire into the state of his health, and report to congress." On the following day was noted, "Dr. Cadwalader and Dr. Shippen returned their report respecting the room where General Prescott is confined, and the state of the general's health, which was read." An order of Congress of October 9, 1776 appointed him to the directorship of a hospital for the army in New Jersey, whereas the hospitals to the east of the Hudson River were left in Morgan's control. Neither Washington nor Morgan had been consulted by Congress in this action and the former openly supported Morgan in the necessity for a centralized control. On November 3, in response to Shippen's complaint, Washington clearly indicated the military exigencies leading to Morgan's orders to detach medical personnel under proper supervision to care for the sick remaining in New Jersey when the Army was moved to

the east of the North River. Not satisfied Shippen carried his plea directly to Congress, recalling their delegation of executive functions to him as Director-General of the Flying Camp in New Jersey over the sick and wounded in that area.

The response of Congress to this direct appeal follows of date of November 28, 1776:

Resolved, that Dr. Morgan take care of such sick and wounded of the army of the United States, as are on the east side of Hudson's river, and that Dr. Shippen take care of such of the said sick and wounded as are on the west side of Hudson's river; and that they both be directed to use the utmost diligence in superintending the surgeons and mates of the army, so that the sick and wounded may be effectually provided with everything necessary for their recovery.

The disrupting forces were not satisfied with Morgan's official humiliation. A greater sacrifice was demanded and it came in the resolution of Congress of January 9, 1777, "That Dr. John Morgan, director general, and Dr. Samuel Stringer, director of the hospital in the northern department of the army of the United States, be, and they are hereby, dismissed from any further services in said offices." It was not enough to dismiss Morgan without a hearing or a trial, but his name was coupled with that of the incompetent Stringer.

Toner's statement of a century later well expressed the public reaction: "Dr. Morgan's displacement by Congress early in 1777 was from nearly all quarters pronounced a hasty and an undeserved censure upon his administration of the medical department." Even more serious than his loss of military position was the almost complete eclipse of his profes-

sional promise. Early efforts for vindication proved fruitless. His communication to Congress had been

good and the safety of the United States, that he should be displaced, and were the reasons of his dismissal; that the doc-

Sir
 York Nov. Feb. 7. 1778
 I was favoured with your letter concerning
 the Business of Resignation. There was nothing excepted in any of
 those Resolutions given in that which says you found you could not do
 charge. You only as you would be which was accepted without advice
 paid by any. I am agree the Subject. I am sorry for the necessity of
 the Measure & yet I question whether you could have done any thing more
 proper for I suppose was fully determined to bring the Matter to a
 decision. You refuse, positively to have with you which would have been
 confirmed on consideration & judgment that it was a most prudent
 to both of you & yourselves in the future. I have mentioned to some Members
 what you propose to do about the Resignation. You know of but they seem
 to be at a loss what Motion or Resolutions you could make. Some Resolutions
 as I think to give a third Report. If however it goes on I am afraid my
 Opinion which I remember from the time of the first time as you
 make use of the word Resignation in your letter to me I beg you
 may pay some regard to my former Opinion which upon that Subject
 which you must well remember. I shall be glad to see you at Philadelphia
 in a short time as I shall probably go home when Dr. Spenser arrives
 My compliments to Mr. Rush & Mr. M^r & Mr. M^r & Mr. M^r & Mr. M^r & Mr. M^r
 I am Sir your most Obedt^t
 humble Servant
 Jas. Witherspoon

FIG. 7. WITHERSPOON LETTER TO RUSH.

referred to the Medical Committee which reported August 9, 1777:

The Medical Committee to whom the memorial of Dr. John Morgan to Congress was referred, beg leave to report, that they find from the journals of Congress, that Dr. Morgan was appointed director general and chief physician of the hospital, in the room of Dr. B. Church, October 17, 1775; that on the 9 January, 1777, he was dismissed from said appointment, that though no cause is assigned for his discharge, yet, your committee on enquiry find, that the general complaints of persons of all ranks in the army, and not any particular charges against him, together with the critical state of affairs at that time, rendered it necessary for the public

tor's memorial appears to your committee to be a hasty and intemperate production; notwithstanding which, as he conceives himself injured, and requests an enquiry into his conduct, your committee are of opinion that he ought to be heard, and that a committee of Congress should be appointed for that purpose.

To this position Congress acceded; but Morgan was destined to expend his valuable time and energies in an unceasing effort to clear his professional name and honor of implied charges of incompetency or worse for two years longer. Not until June 12, 1779 was his end to be achieved.

Meanwhile it is not to be judged that Morgan's successor found his official position a bed of roses. Three

William Shippen, Junior—Director-General of all military Hospitals. Walter Jones—Physician-General of



FIG. 8. FROM SHIPPEN'S ACCOUNT BOOK.

months intervened between Morgan's removal and the appointment of his successor in the person of William Shippen, Junior. Evidence of the latter's ambition in this direction may be found in his proposal of February 14, 1777 to Congress for the reorganization of the Medical Department of the Army. This plan, which followed the British medical establishment rather closely, was the joint effort of John Cochran and Shippen. The Medical Committee under the dominance of Benjamin Rush reported on this proposal and advised delay in reorganization. On March 24, 1777 it was adopted in a revised form. With the revised plan came the following appointments of the date of April 11, 1777:

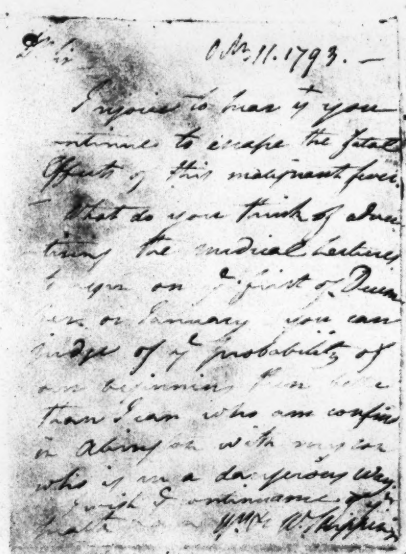


FIG. 9. SHIPPEN'S LETTER TO RUSH.

Hospitals for the Middle Department.

Benjamin Rush—Surgeon-General of Hospitals of the Middle Department.

John Cochran—Physician and Surgeon-General for the Middle Department.

Civilian cooperation with the Medical Department continued loose and uncoordinated. The several agencies for medical assistance from these sources frequently acted as boomerangs. Great as are the obvious advantages of such auxiliaries, they inevitably carry with them the chance of friction and cross purpose. For example on December 5, 1776 the Council of Safety of Pennsylvania had "resolved, that Mr. Christopher Marshall be employed to assist the physicians in providing for the sick, and that he have authority to employ

proper persons to assist him in procuring houses for them to lodge, and such other necessities as may alleviate

The sequel follows:

17. After breakfast, went to the office, where the members present last night,

Dear Sir,
I am pained with yours of the 27th.
I try hard to choose that the inconvenience
of moving any sick from your
Division to Princeton, will be vastly less
than will arise from establishing
a separate Hospital at Princeton.
The danger will be less when we con-
sider that it is expressly ordered by the
Congress, that every sick soldier shall
be sent to a Continental Hospital
as any other that is being removed
necessary for him, than what is in-
dicated. — All Regimental
Hospitals are absolutely forbid by Con-
gress, which part of out of my power
to comply with your order in pursu-
ance of Dr. Hodge's requisition. The only

in your Division
Dr. Maryland & every other Institution
as they are proper subjects from which
must be sent to the Hospital at Princeton
where no cost or pains is spared to
make them happy & comfortable.
All sudden accidents & accidents will be
taken care of by Dr. Schenck, in a house
of his flying Hospital, where he
can meet you on your side of the river.
Wishing you success against the
common enemy

I have the honor to be
Dear Sir

Yours very humble servant
W. Shippen Jr.

General Hospital
May 29, 1777.

FIG. 10. ADDENDUM A. LETTER OF WILLIAM SHIPPEN, JR., TO MAJOR-GENERAL SULLIVAN.

their distresses and render them comfortable." From Christopher Marshall's Diary for January 14, 1777 is quoted:

A number of sick soldiers coming in, Visited to-day by Mr. Shippen, Jr., who being chief physician for the army here, proposed the taking of the sick soldiers from the sundry houses in this city, where they are now placed, into the House of Employment to-morrow. This proposal I communicated to the Council of Safety (who had requested me to take charge of the sick soldiers about a month past), in order for their determination, but received no answer this evening, as they were very busy.

met and agreed to send two members with our application to the Council of Safety. The members were Thomas Leach and William Ball, who brought for answer to us that we should proceed in our appointment as before, without paying any regard to Dr. Wm. Shippen's notices, etc., upon which we resumed our former care and regard to sick soldiers and prisoners.

Morgan's partisans were by no means active supporters of the new regime. Indeed, immediately upon Shippen's appointment the opposition took form; but to external appearances the defection of Benjamin Rush would seem remarkable. For a clear understanding of the friction between

Shippen and Rush certain earlier sources in the Rush Manuscripts must be consulted. A letter from Rush's brother Jacob of January 24, 1771 from London likens Shippen to Cassius and states, "I am sorry that Dr. Shippen has kept away students from attending your Lectures. At the same Time, I am not at all sorry that you are at Variance with him. Better, infinitely better is it to be at eternal Variance with a Man of his cool Malice and Treachery, than to have any connection with him." Benjamin Rush pursued much the same plan of attack by innuendo and correspondence with political leaders which Shippen had so successfully used in displacing Morgan. Letters of criticism to members of the Continental Congress were the order of the day. On one occasion, Rush charged maladministration and overcrowding of the Brethren's House, Bethlehem. He averred that Shippen had visited this hospital but once in five months. Relative to the occupancy of this building, Shippen, always mindful of the amenities of the situation (See also Addendum A), had written September 19, 1777,

Gentlemen:

It gives me great pain to be obliged, by order of Congress, to send my sick and wounded soldiers to your peaceful village; but so it is. We will want room for two thousand at Bethlehem, Easton, and Northampton, and you may expect them, on Saturday or Sunday.

These are dreadful times; consequences of unnatural wars. I am truly concerned for your Society, and wish sincerely this stroke could be averted, but 'tis impossible.

William Shippen.

Rush's position apparently grew unbearable; yet he was unwilling to relinquish his post without accom-

plishing the downfall of Shippen, as the following letter to his wife from Yorktown, January 15, 1778 indicates:

Upon my arrival in Yorktown I found such a general disposition among the members of Congress to correct the Abuses and reform the System of our hospitals, that I readily yielded to the solicitations of my friends in suspending my resignation. Dr. Shippen is summoned to appear with me on the 26th of this instant before Congress to answer for the many complaints that are made against his management of the hospitals. It will be a disagreeable task to accuse him publicly of ignorance and negligence of his duty—But the obligations I owe to my country preclude all other ties. I shall act strictly agreeable to the dictates of my conscience & If the System is altered and Dr. Shippen can be restrained by proper checks from plundering the sick, I shall not resign my commission, but shall serve another campaign. This resolution is taken not only from a sense of duty, & a love for my country, but in consequence of the advice of some very worthy members of congress who assure me that a contrary step will be ascribed to a want of perseverance or to downright disaffection.

This personal letter followed close upon the summons of Congress, January 6, 1778, to Shippen and Rush requesting their presence before that body to discuss certain abuses alleged to prevail in the hospital. After an exchange of messages between the interested parties, Rush wrote to Congress asking for permission to resign. Witherspoon's counsel was sought as to the form of this resignation. However, in a letter of February 25, 1778 to Washington he denied that his resignation was the outgrowth of the misunderstanding with Shippen. Apparently his various charges against his superior officer

had led to the appointment of an investigative committee by Congress. This arrangement was not agreeable to Rush, who wrote a further note to Congress urging courtmartial and affirming his willingness to provide full evidences of all of his charges before such a body.

With the growing clouds of dissension and distrust Shippen still radiated a spirit of geniality and good fellowship which endeared him to a considerable group of his associates. In Thacher's "Military Journal," May 10, 1780, the following note is made: "We sat at table till evening enjoying the conversation of the learned Doctor Shippen, director general of the hospital department." Brown, although critical of certain details in his chief's conduct, wrote to Morgan, December 28, 1780, after the storm had broken:

I found him on a personal acquaintance, to be good humoured and agreeable in his address, respectable in his connections and in the rank he held in his profession: Although as an officer, and in his station of director general, I judged him to be too much disposed to indolence and inattention, too irregular and unmethodical in his transactions, and so easily captivated with the prospect of pleasure, as to be evermore prone to engage in the pursuit of it, than to apply assiduously to business; yet I did not doubt but he possessed valuable talents and good qualities enough, in other respects, to compensate those imperfections.

Morgan's "Vindication of his public character in the station of Director-General of the Military Hospitals and Physician in Chief to the American Army" appeared in 1777 and constituted the passionate appeal of a deeply wronged individual for a fair trial. One line of attack by which he attempted to establish Shippen's

Machiavelian activities contains the following passage:

Perhaps artful men may here alledge, that I ought, therefore, to have submitted to the difficulty, and discharged my care of the sick, of the army, on the western Director. I would ask them for what purpose, whether to bury him with the load, when he could no more take care of the sick of the flying camp only, than I could of the whole army, unless by depriving me of my own officers and stores; or was it, to reduce me to a cypher, in order to raise him into importance? Had the Congress supposed that I had too much, and he too little to do, I would cheerfully have transferred to him the superintendence, and management of as many, as his heart desired, only reserving my rank, and the command of my own officers, hospitals, and stores. But I have good grounds to believe, that his underhand attempts to interfere with me, in my department, and his interest with a particular set, which has been employed to effect my removal, with a view to promote his design of succeeding me, have operated more powerfully to accomplish it, than all others, that have been held up, as the ostensible causes of my removal, which, however, he may think, from being transacted behind a curtain, they be concealed, can be easily traced to their author, and are of a tissue with the rest of his conduct towards me, on similar occasions.

Not satisfied with official vindication at the hands of Congress, June 12, 1779, Morgan wrote to Congress three days later charging Shippen "with mal-practices, and misconduct in office, and declaring his readiness to give before the proper court having jurisdiction, the necessary evidence in the premises against the said Dr. William Shippen."

The latter was not passive in his reaction to these multiplying attacks.

From Christopher Marshall's notes of the day two significant entries of April 28 and 29, 1780 are copied:

28. Just going to bed, past ten, came Dr. John Morgan and the Under Sheriff, who had been after him to Ephrata, having a writ against him in the suit of Dr. Houston for slander of him, it's said, in the time of the flying camp. I proposed that if the officer would leave him here, I would deliver him up in the morning, but the Doctor chose to go down to Adam Reigart's. So they went away before eleven.

29. Returned to dinner. In the interim Dr. Morgan called; said he had been bailed for ten thousand [dollars] by Col. Atlee; thanked my wife for our civilities with his compliments to me, he being just going to pursue the cross-examination with Dr. Shippen in the sundry different places. At dinner, came Dr. Houston. By his coming and conversation, I thought he was conscious that his conduct with Morgan was censurable, which, in conversation, I let him know was mine and many others' judgment on this occasion, it appearing to them as a scheme of Dr. Shippen to prevent his proceedings and therefore altered the minds of sundry of Dr. Shippen's friends, who were in his favor and interest before this action, being so glaring and fraught with malice and ill will.

Finally, Washington was instructed to proceed with the inquiry. Shippen viewed the whole affair with ridicule and disdain (Addendum B); but he spared no pains to avert personal degradation. The motion for his acquittal carried August 18, 1780 with an important amendment, "excepting that part of the 2nd charge relating to his speculating in hospital stores, on which the court judge him highly reprehensible." Hence there still remains some doubt as to Shippen's innocence of certain of the charges.

Although he was re-elected Director-General September 30, 1780, under a plan of reorganization of the Medical Department by which the quartermaster's functions were taken by other offices of the Army, he served only three months longer, resigning January 3, 1781. Morgan felt that "in driving from his fast-hold in office, an unprincipled and corrupt servant of the public" he had served his country most effectually. His attitude toward Shippen constitutes the sole expression of vindictiveness; but it is possible that the instinct of self-preservation coupled with a sense of deep personal and professional injury led Morgan to such persistence in attacking his former confrere.

This personal controversy was carried into private life; for, on the resumption of the work of the Medical School, Rush and Morgan urged the Board not to reappoint Shippen to the faculty. Failing of their purpose on February 28, 1781, both of them refused to serve on the same faculty with their former colleague and friend. In the hope of restoring harmony all three were re-elected to their former chairs; but by reason of indisposition and lack of sympathy with the policies of the school Morgan never resumed his teaching, although his position in the faculty remained vacant until the year before his death.

During the war the College of Philadelphia had fallen into popular disfavor by reason of the Tory activities of certain of its leaders. By an act of Legislature its charter was abrogated November 27, 1779, although the accustomed notices of the medical lectures had appeared in the *Pennsylvania Gazette* for October 24th of the same year. In place of the College of Philadelphia there arose a politically

supported University of the State of Pennsylvania which was greatly strengthened by the income from

March 6, 1789 with the active support of Benjamin Franklin, the earlier act of Legislature was set aside and the

Dear Sir *Friend's letter of mine from this*
7 Feb 1789
 Your kind & friendly letter came to me like a welcome guest, at a lonely place about 4 miles from the city, where I am with my Brother. I am writing my accounts for attending previous to my very trial. In the my adversary is a malicious & insidious friend animal yet he is indigestible & unpalatable. I am of your opinion & thank you for the hint that I should be careful to take every pains to show my innocence. — The time he would use to take with him, we must have no post to accomplish in the last meeting or no longer delay, how do you think it was to be done in the entire first week of January with some every where up to the Congress. The consequence was, that the attack if it had been every other hour would become of no avail by not being performed at the time appointed. The wise Congress say these descriptions shall be used in evidence if I am acquitted & charged on both sides as per sent. — who made him a party as per sent.

As a member of Congress and, as may be perceived, but the united States are the prosecutor or party. — They have not yet cited me to so curious a journey. — The 1st of March when he arrived at Reading, he had made the greatest improvement & say he was ^{improved} & he only made out 6 miles, he was ^{improved} were dug out of the snow and when they reached the general he was frozen to the saddle. — He is truly ridiculous & contemptible. I long to draw his portrait of a ^{man} *Shippin*! that's true, is it not common that he should be appointed to read the 9. Masters Department & after that I shall not be surprised to hear of his was appointed Inspector of Medical & said a League to watch a ^{man} *Shippin*. The sentence of general Smith's but yet divulged, but they whisper he has written some and with some from Tories. — Our friends know all about it, you know know, you know know. — I want my last letter to him his lady & young ladies in

FIG. 11. ADDENDUM B. LETTER OF WILLIAM SHIPPEN, JR., TO MAJOR-GENERAL GREENE.

confiscated properties. The senior Shippen, Drs. Bond and Hutchinson were constituted a committee on the Medical School. Great difficulty was met in completing the faculty of this interloper. In fact William Shippen, Junior, was the only professor of the old group to accept a proffered chair. In 1781 to spare the Trustees further embarrassment Thomas Bond agreed to unite the theory and the practice of physic with his clinical lectures; but not until November, 1783 was the faculty completed by the appointment of the former professors with the exception of John Morgan.

So strong were the adherents of the College of Philadelphia that on

property of the College reverted to its rightful hands. On March 13, 1789 the following faculty was announced:

William Shippen, Junior, Anatomy
 Adam Kuhn, Botany and Materia Medica

Benjamin Rush, Chemistry.

In Morgan's continued absence from the city and apparent disinterest in the affairs of the Medical School, a rearrangement was affected by which Rush acceded to the chair of the theory and the practice of physic on October 24, 1789. Kuhn's displeasure was witnessed by his resignation from the faculty of the College five days later and his subsequent appointment to a like chair in the University on

State. By means of this event, the ancient harmony of the different professors of medicine will be restored, and

Caspar Wistar, Chemistry
Samuel Griffitts, Materia Medica
and Pharmacy
Benjamin Smith Barton, Natural
History and Botany.

A measure of Shippen's popularity as a teacher at this stage of his career is gathered from the Minutes of the University of April 6, 1791:

The Professor of Anatomy, who is also Professor of Anatomy under the College, has been attended in his last course of lectures which commenced in November 1790, by one hundred and four. About twenty of these have not attended the lectures of any other of the Professors of either Seminary. Fifty-five, however, have attended the lectures of the other Medical Professors of the University with a view to graduation in it.

The presence of two rival medical schools in Philadelphia was not wholesome and the wiser heads soon saw the necessity for a union of forces. Singularly Shippen was the only man to serve on both faculties simultaneously; but it was largely through Caspar Wistar's untiring efforts that harmony was finally restored and a union effected by Legislature under the designation of the University of Pennsylvania on September 30, 1791.

Rush struck the popular note in his introductory of November, 1791:

I should do violence to my feelings should I proceed to the subjects of the ensuing course of lectures, without first congratulating you upon the union of the two Medical Schools of Philadelphia, under a Charter founded upon the most liberal concessions by the gentlemen who projected it, and upon the purest principle of patriotism in the Legislature of our

Mr. Wells, I hope that cordially to you
as well as to your good lady, & your
Jeffery who must be this time he ap-
peared at Lamb. & E. & was as little
-chased to Germany as Mr. Olney judge
I should have mentioned her, but you may
tell her I do love her. Kiss her & I
think George much respecting it
to the rest of your affections, joining
Remains, you know Emerson
"spot. am I to quarrel there
to are to be on my back the
You see my d. - for the spirit of you
friendly spirit, & of. I have made to
free with your time, thank you
for it, but at the same time do me
the justice to believe.
I am with true esteem
Your affectionate
Some people go up. Some hand, but
fill & come down again.
Some folks don't fight but are and
that here may live fight with you
Victory is the better part of Victory.
Hudson.

FIG. 11. CONT.

their united efforts will be devoted, with accumulated force, towards the advancement of our Science.

The new faculty elected January 23, 1792 comprised the following members:

William Shippen, Junior, Anatomy,
Surgery and Midwifery
Caspar Wistar, Adjunct to Shippen
Adam Kuhn, Theory and Practice
of Physic
Benjamin Rush, Institutes of Med-
icine and Clinical Medicine
James Hutchinson, Chemistry
Samuel P. Griffitts, Materia Medica
and Pharmacy

Benjamin Smith Barton, Botany and Natural History.

When peace seemed about to settle on his troubled career, Shippen's son became afflicted with an insidious and protracted illness, probably tuberculous in nature. This boy had been raised and trained with the sole thought of his succession to his father's professional position. Every advantage of social and intellectual contact had been his. As a child he had been a favorite of Washington. Jefferson had arranged for his entree in France and Adams favored him with every attention in England. A four years' sojourn abroad had served to broaden his cultural horizon to the full anticipation of the elder Shippen's dream. With the shock of his son's progressive decline came a mellowing of many of his personal enmities and into the following letter to Benjamin Rush may well be read an improvement of the relations between these powers in medical Philadelphia of that day:

Oct. 11, 1793

Dr. Sir.

I rejoice to hear that you continue to escape the fatal Effects of this malignant fever. What do you think of advertising the medical lectures to begin on ye first of December or January—you can judge of ye probability of our beginning them better than I can who am confined in Abington with my son who is in a dangerous way. I wish ye continuance y^r health & am

Yrs. tr.

Wm. Shippen, jr.

The death of this favored son almost submerged Shippen. His wide practice was neglected and only occasionally did he lecture. Much of the time he was engrossed in religious study. However, several years before his death, Shippen threw off the shroud of

depression which had so long engulfed him, and became active once more in the affairs of the College of Physicians of which he was one of the founders. On the retirement of John Redman in 1805 he was elected the second president of this organization. The enlargement of the recently acquired presidential residence in Ninth Street by the University to accommodate the medical classes greatly interested Shippen. With the opening of the new amphitheater in 1806 came renewed activity. All of the faculty had at some time been his students and, too, the wide dissemination of his former pupils to every part of the new and growing country was a source of great satisfaction to him. Caldwell reports that on his return from the dedication of the new Medical Building Shippen had quoted Simeon, "Now, Lord, lettest thou thy servant depart in peace, since mine eyes have seen."

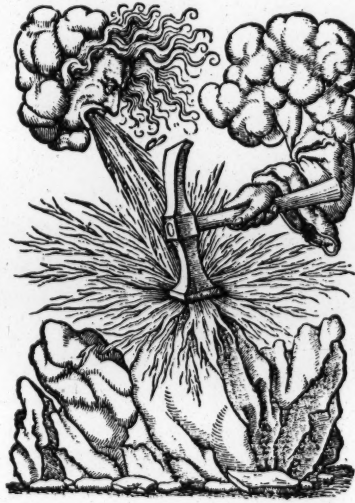
Attacks of vertigo led to mental depression. The picture of advancing senescence was further painted in recurring hydrothorax. Early in the summer he retired to his country place in Germantown and succumbed to anthrax, July 11, 1808, in his seventy-second year.

William Shippen, Junior, will live in the annals of medical history as the first systematic teacher of anatomy and midwifery in colonial America. To him has been granted a remarkable personality and ability as a teacher which have survived the intervening generations of doubt and criticism levelled at his alleged betrayal of his associate, John Morgan. Certainly his career during the Revolution was checkered and one can scarcely admit S. Weir Mitchell's characterization, "So amiable through life he is said to

have made no foes, a doubtful formula of praise." By the same token it is generally admitted that by pualities of person and heart Shippen so surmounted the adverse sentiment of the war period as to live and die high in the esteem of his fellow-citizens and medical confreres.

Grateful appreciation is herewith expressed to Prof. E. B. Krumbhaar for his courtesy in supplying the illustrations of the Fothergill anatomic charts and to the Librarian of Congress for the several photostatic reproductions accompanying this article.

[The End]



SOME INCIDENTS OF MEDICAL INTEREST IN THE LIFE OF GENERAL LAFAYETTE*

By JULIUS FRIEDENWALD, M.D., AND SAMUEL MORRISON, M.D.

BALTIMORE, MD.

THE life of Lafayette is replete with remarkable adventures not only in France but in many parts of Europe and in this country as well, and many publications have appeared from time to time describing in detail one or another of the many interesting phases of this great man's life. To those who have not yet read Brand Whitlock's Biography of Lafayette there is still in store an unusual treat of a combination of fascinating historical study, literary talent and human contact rarely found.

The incidents of medical interest in the life of Lafayette are numerous. One need only point to the enthusiasm which he exhibited for the occultism of Cagliostro and the so-called animal magnetism of Mesmer, indicating his willingness always to accept new fads, an extremely curious turn for so well-balanced a mind. It is said that he was facetiously asked by Louis XVI: "What will Washington's attitude be towards your advocacy of Mesmerism?" Lafayette even went so far as to write Washington promising to obtain permission from Mesmer to initiate him into the secrets of the "great philosophical discovery" even though he himself was slightly skeptical concerning it. Washington, however, was not particularly interested since his time was occupied with far more important affairs.

Lafayette's physician, Jules Cloquet, who since the beginning of his medical career had been closely as-

sociated with the General, published an interesting volume on the "Recollections of the Private Life of Lafayette" which appeared in both French and English in 1835 and 1836 and which presents many interesting details concerning the Marquis' life with an account of his last illness. On February 1, 1834 in attending the funeral of Dulong, an intimate friend and a member of the Chamber, who had died as the result of a duel with General Brigand, Lafayette, on foot, accompanied the hearse to the cemetery quite a long distance away. He was exposed to the cold winds and upon returning home was taken with a chill which was apparently associated with difficulty in urination. Catheterization was necessitated and this was undertaken by Doctors Cloquet and Guersent and in a few days the patient had so far recovered as to be able again to receive visits from his friends. He soon improved so far as to be able to have a drive daily in a closed carriage to the Bois de Boulogne, to alight for a walk and to visit his grand-daughter, Madame Adolphe Perrier, whose home was at the entrance of the Bois. On May 9th while driving to his grand-daughter's he was overtaken by a thunderstorm and his former bladder difficulty returned, associated with chills and fever. He became drowsy and slightly delirious and his respirations became rapid, all to Doctor Cloquet's alarm. He called in consultation Doctors Fouquier, Marjolin and Andral but

* Read before the Osler Historical Society, Baltimore, Md., March 15, 1932.

the patient gradually grew weaker and lingered on until May 20th, when he died surrounded by his

He escaped to Rochefort where he was arrested by Austrian troops, notwithstanding an international un-

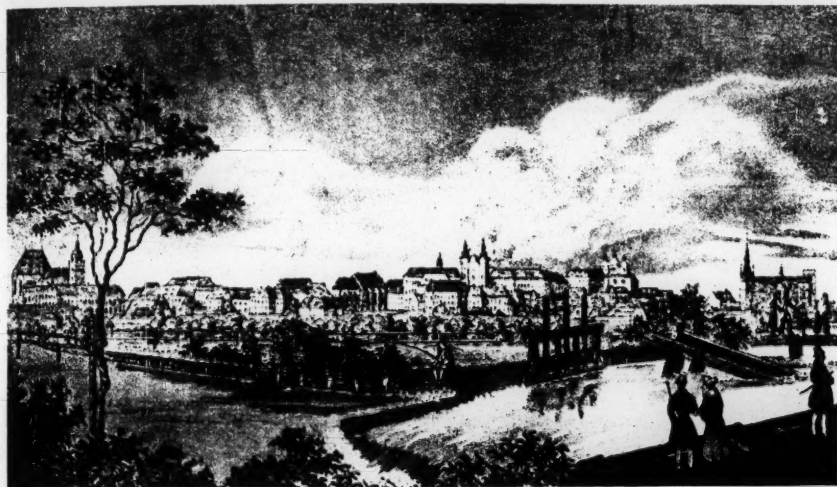


FIG. 1. OLMÜTZ, SHOWING IN THE FOREGROUND THE FORTRESS IN WHICH LAFAYETTE WAS IMPRISONED.

children Anastasie, George Washington, and Virginia.

But the phase in the life of Lafayette which we desire especially to describe in this sketch is his association with two young medical men and the interesting role played by them in his behalf.

In the memorable attempt of General Lafayette to assist us during the Revolutionary War, and following his voyage of fifty-four days, he finally landed in South Carolina. His first visit, made accidentally, was to the home of Major Benjamin Huger, Prospect Hill, North Inlet in the Bay of Georgetown, where he made the acquaintance of Francis Kinloch Huger, the son of Major Huger, then three years of age. The Marquis little suspected that this youth would by a strange coincidence play an important role in his life at some future time.

After the rise of the Commoners in Paris, Lafayette's arrest was ordered.

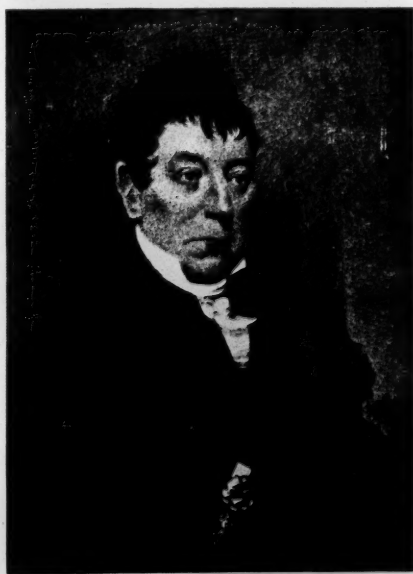


FIG. 2. LAFAYETTE (1757-1834). PAINTED BY CHARLES FRASER FOR THE CITY OF CHARLESTON IN 1825, WHEN LAFAYETTE VISITED THAT PLACE WHILE ON HIS TOUR OF THIS COUNTRY. PRESERVED AMONG THE HISTORICAL PICTURES IN THE CITY HALL OF CHARLESTON. (FROM HUGER SMITH.)

derstanding to the contrary. He was taken to Namur, to Nivelles, and then

to Luxembourg and handed over to the Prussians. After ten days he was transported down the Rhine to

in a dungeon reeking with the stench from open sewers. Here he became acquainted with the prison physician,

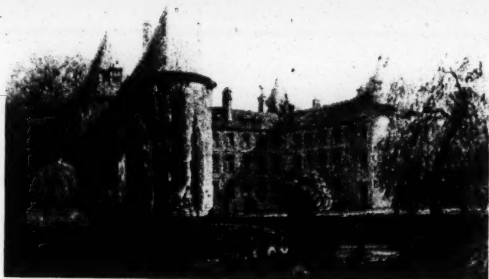


FIG. 3. CHATEAU LA GRANGE, AFTER AN ENGRAVING OF 1840, AND AS IT STANDS TO THE PRESENT DAY.

Wesel where he was subjected to solitary confinement in prison. He was next transferred to a subter-

a Doctor Haberlein, who had evinced great interest in Washington and on this account friendly relations were soon established between the two. Although far from home, Lafayette had a score of friends in France as well as across the seas, who were greatly concerned as to his welfare, eager to learn his whereabouts as well as to assist in restoring him to freedom. Notable among these was his intimate friend Lally-Tollendal who had already written to the King of Prussia in his behalf and who in his enthusiasm inspired a young romantic physician, Justus Erich Bollman, then twenty-three years of age and able to converse fluently in German, French and English, to likewise recognize the great injustice perpetrated against his friend.

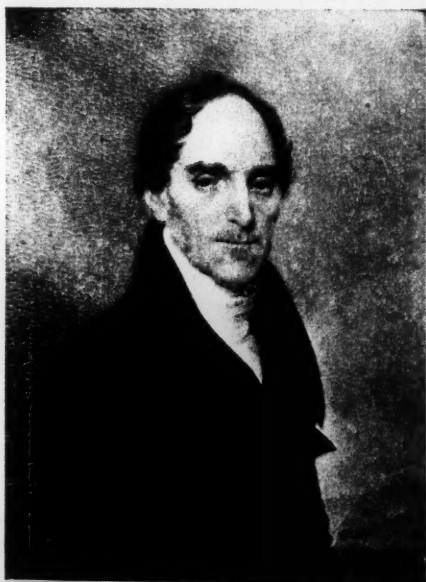


FIG. 4. FRANCIS KINLOCH HUGER (1773-1855). PAINTED IN 1825 BY CHARLES FRASER FOR THE CITY OF CHARLESTON TO PRESENT TO LAFAYETTE. NOW AT THE METROPOLITAN MUSEUM OF ART, NEW YORK. (FROM HUGER SMITH.)

anean dungeon in Magdeburg; then to Nusse and finally to a fortress in Olmütz, Austria, where he was secretly confined under constant guard

Bollman was an Hanoverian with republican ideas who had studied in Gottingen and had practiced for a time in Carlsruhe and Paris. He had become interested in Madame de Stael and at her instigation successfully accomplished the escape, to England, of the former Minister of War, Narbonne. In England his enthusiasm over Lafayette was further

aroused through the great anxiety expressed by many of the General's American and French friends, whom inspection as he then suspected that Lafayette might be located here. In order to disguise the object of his

separated from the Horse on which Bollmann
myself rode falling, & in consequence of this he
mistaking his way. He rode so hard however that he
reached a town thirty miles from hence in an hour
a quarter. He here passed himself for a Merchant
& had procured a fresh Horse when he was known
by a Clerk who had seen him when he was trans-
ported from St. Louis, & declared with the assistance of
the people who were present. From this place he had
only twenty miles to reach the frontier, which he
had gained he was to probably have escaped, as
the pursuit was difficult. Mr. Pinckney, Minister, Philadelphia
looked a
direction
from the United States of America, London, Bollmann
to take the liberty of begging your aid for twenty to Mr.
D. G. of Philadelphia & to inform the Banker of such accounts
as he may have heard of me by which he may acquire
the character of an officer of the United States of America
he is appointed to my use, but he cautions not to give
any reason to suspect I had privately written. Perhaps
Bollmann had retained such a supply. we should have
been induced from our Alliance of eight years ago to
D. G. will instruct Mr. Pinckney to write to my Mother
if of some kind ever he is in England, & to inform her
from your friend to my friend. I hope one day to find
her. I hope the mean time to be of some use to my friend
J. H. Huger.

FIG. 5. LETTER WRITTEN TO MR. PINCKNEY, MINISTER Plenipotentiary in London, now in the Possession OF THE SOUTH CAROLINA HISTORICAL SOCIETY.

he had learned to know and who soon encouraged him to make an attempt to bring about Lafayette's rescue. Fortified with a liberal supply of funds, he set out for Germany in 1793 but had great difficulty for some time obtaining any information regarding the prison in which Lafayette was held. After numerous ineffectual attempts he was apprized of the fact that the prison in Olmütz, a Moravian fortress, held some French prisoners. He wandered there on a visit of

sojourn, he travelled as a student of science with a rucksack on his back, but only remained sufficiently long to definitely satisfy himself that he had discovered where the General had already been imprisoned for a period of six months. He made an inspection of the fortress as well as the frontier and was informed that among the other prisoners were Beurnonville, La Tour-Maubourg and Bureau de Pusy. He returned to Vienna in order to consummate his plans. In Sep-

tember of 1794 he again journeyed to Olmütz and concluded that the object of his visit could be most satisfactorily

to secure the benefit of the fresh air. As time went on, Bollman informed Haberlein that he carried with him



FIG. 6. MEDALLION IN BRONZE BY R. TAIT MCKENZIE, PRESENTED TO THE UNIVERSITY OF PENNSYLVANIA BY MR. JOSEPH I. DORAN, NOVEMBER 5, 1909. NOW IN THE MEDICAL HALL, UNIVERSITY OF PENNSYLVANIA.

brought about by gaining the friendship of the prison physician Doctor Haberlein and this was easily accomplished since both were interested in botany and Haberlein likewise in General Washington. The conversations readily led to the name of Lafayette which finally gave Bollman an opportunity to send his greetings with the word that he had recently seen a number of his friends in London. Lafayette was much interested, though he had never known of Bollman before, but he suspected the possibility of an attempt on the part of some of his friends to free him and so he finally returned his thanks to Bollman through Haberlein.

During this period Lafayette was still confined to his prison cell, but not feeling quite well and suffering with pains in his chest, he made the request through Haberlein for permission to be allowed a daily ride so as



FIG. 7. I. ERICK BOLLMANN. FROM THE DREER COLLECTION, HISTORICAL SOCIETY, PHILADELPHIA. ENGRAVED AND PRINTED AT LEIPSI, ABOUT 1796.

a number of French books which he would gladly loan Lafayette. He was informed that this would be permissible, provided the books were first inspected. The books were sent but Bollman had scrawled on one of the pages words which, when connected, were interpreted as follows: "If you read this book with as much care as you lent your friend at Magdeburg, you will receive equal satisfaction." Lafayette remembered the fact that the person referred to had received an account of plans for his escape from imprisonment written on a page with lemon juice, and understood the meaning. By placing the book toward the fire he soon recognized that his friends were planning his rescue. Upon the return of the book Bollman noted the words: "Hold it to the fire" written upon one of the pages and on doing so learned that

Lafayette could be recognized and identified by a simple signal, that is, Lafayette would pass his handker-

London and how in 1794 he was engaged for some months as surgeon on the Medical Staff of the Army

If I am not mistaken Your Excellency mentioned, when I had the honor to wait on You about three weeks ago, that You intended to have some farther conversation with me through Mr. Pickens. Not having had the pleasure to see Mr. Pickens since, and going to depart for New York in a few days I think it my duty to inform Your Excellency of this in order to receive Your commands. Waiting which I have the honor to be with the highest respect

Sr

*170 Highstreet
March 4. 1796*

*Your Excellency's
most obedient and humble servant
D. Erich Bollmann*

FIG. 8. LETTER FROM DR. BOLLMANN TO GENERAL WASHINGTON. ORIGINAL IN THE LIBRARY OF THE HISTORICAL SOCIETY OF PENNSYLVANIA.

chief across his forehead when out driving. He also informed Bollman that he was allowed a drive every other day. Bollman had again left for Vienna. In the meantime, by a strange coincidence he became acquainted with Francis Kinloch Huger in a small restaurant in Vienna. The conversation soon turned to America and Lafayette. Huger was impressed with the greatness of Lafayette as well as with the fact that he had met Lafayette as a child of three years when the General first set foot upon American soil on June 13, 1777. He eagerly informed Bollman of Lafayette's visit to his home following his landing at Georgetown Bay. Huger described his own visit to England when eight years of age and his return to South Carolina on a short visit in 1791, his return to England to continue his medical education and his studies under John Hunter in

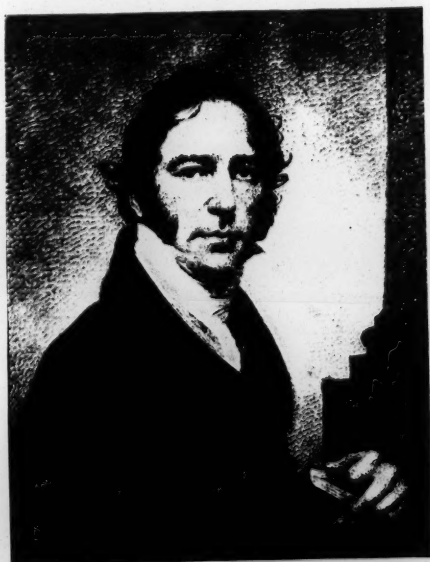


FIG. 9. CHARLES FRASER (1782-1860). PAINTED BY HIMSELF, 1823. (FROM HUGER SMITH.)

under the Duke of York in Flanders, following which he resigned for further study in Vienna. Huger was now

twenty-one years of age. Bollman soon confided his plans to Huger who likewise revealed his eagerness to assist in the liberation of Lafayette. Following a prolonged conference they agreed as to the plan to be followed. They bought a post-chaise with secret pockets, secured ropeladders and other necessary apparatus needed in escapes and with two servants and two horses, one of them trained to carry double, set off for Olmütz, a distance of 150 miles from Vienna. Huger under the guise of an English nobleman and Bollman as his tutor must certainly have made an impressive appearance.

It was on the 19th of October when during one of his drives Lafayette saw two strangers gazing upon him. He at once passed his handkerchief to his forehead and both of the men returned the salute. He let fall a note to the ground, containing instructions as to how the escape should be undertaken. He should be met with a horse when out for a drive; the corporal must be overpowered and he was to make his escape on the horse. After several weeks Doctor Haberlein informed Lafayette that Bollman intended leaving Olmütz on November 8th, which was the date of his next drive. This was a definite signal for the attempt at escape.

On the 8th of November everything was in readiness. The chaise and servant were sent off by Bollman and Huger to Hoff, a post-town twenty miles distant on the road over which the escape was to be made. Lafayette took his drive as usual in the afternoon with a corporal in the seat and a soldier next to him. Bollman and Huger mounted on horses rode toward him. As they passed by, Lafayette signalled by raising his handkerchief

to his forehead; they turned around after a short time and followed the carriage. When they arrived in the open country, Lafayette alighted pretending that he needed the exercise and then waved his handkerchief behind his back. He recognized the quick trot of the horses back of him and grasped the hilt of the officer's sword partly withdrawing it. A scuffle ensued and Bollman and Huger were at his side. They quickly alighted, overpowered the soldier who was slightly wounded and held him to the ground. The corporal rushed toward the prison, giving the alarm and shouting for help. Lafayette, now free, mounted the horse while Huger called "Go to Hoff." He slowly moved on but quickly returned declaring that he did not wish to leave his rescuers since the other horse had run away. Bollman and Huger reminded him that no time was to be lost, urged him to go and reluctantly he galloped off. Huger succeeded in catching the other horse which both mounted and then attempted to follow Lafayette. It was unfortunate, however, as the horse that was trained to carry double had been taken by Lafayette and the one mounted by Bollman and Huger, unaccustomed to two, reared, stumbled and threw both its riders. It was evident that the two could not escape and Bollman was singled out to follow Lafayette alone. It was not long before the entire country was aroused and in pursuit of the fugitives. Huger took refuge in the woods behind a tree, but his pursuers were too numerous and he was soon apprehended and returned to Olmütz.

Bollman reached Hoff without difficulty but unable to find Lafayette after many hours of delay, lingered on

the frontier wandering finally into Silesia where he was arrested and sent to Olmütz.

In response to the injunction of Huger to go to Hoff, Lafayette continued on the road for hours and had ridden twenty-four miles when he was finally captured and returned under heavy guard to Olmütz. Through an error he had unfortunately misunderstood the words of Huger, "go to Hoff" for "go off" and consequently followed the wrong road.

Lafayette, Bollman and Huger were all placed in solitary confinement in the prison at Olmütz.

Lafayette, now ill with high fever, was made to suffer and was tortured with investigations in order to determine whether the rescue was in the nature of a political plot to start an Austrian revolution. Six weeks passed during which the trial took place. As both Bollman and Huger admitted their part in the attempted rescue the evidence was short. Both made addresses in their own defense. Bollman frankly stated that he acted for the friends of Lafayette in attempting the release of the General whom they considered had been unjustly imprisoned. Huger showed that he had no connection with the plan organized by Lafayette's friends and pleaded that in aiding him to obtain liberty his only desire was to return to freedom a man who had done so much to establish the independence of his own country in America.

When it was finally decided that there was no political plot Bollman and Huger were sentenced to six months' imprisonment in irons to be followed by banishment. At the same time, Lafayette was given a similar sentence of three months. He was, however, not freed from the prison at

Olmütz until September 19, 1797, over five years after he had been incarcerated.

Bollman and Huger were released and banished in July, 1795, and left at once to cross the border. They had just cleared the Austrian frontier when an order commanding a new trial reached Olmütz. It is quite possible that had they still been there a far heavier sentence would have been given them, possibly the death penalty.

Huger returned to America in 1795 and continued his medical studies at the University of Pennsylvania, graduating in 1797, but did not enter the practice of medicine. He was commissioned a Captain in the United States Army in 1798 during the threatened war with France. He married the second daughter of Thomas Pinckney (former minister to England) in 1802. In 1812 he was commissioned Colonel during the war with England, serving until 1815 on the Staff of General Thomas Pinckney. After his marriage, he purchased an estate on the hills of Santee, a hundred miles from Charleston, where he established himself with his family, consisting of his wife and eleven children. When Lafayette again visited America in 1824 he received a welcome such as no other foreigner has ever had. Colonel Francis Huger, now of middle age, welcomed him in New York, travelled with him and again was among the first to welcome him in Charleston. Huger led a retired life with the exception of serving two terms in the Legislature of South Carolina. In 1826 he and his family moved to the neighborhood of Pendleton where he spent his remaining days in the pleasant occupation of reading. His watch words were always

"temperance and moderation." Lafayette held him in the highest esteem and in his home, the Chateau La Grange, he had placed an exquisite miniature of Huger, presented by the City of Charleston in 1825.

In the "Recollections of the Private Life of General Lafayette" by Jules Cloquet, M.D., published in London in 1835, there is a description of the Chateau La Grange, the home of General Lafayette. In describing the receiving rooms of the chateau, the following appears:¹

On one side of the chimney may be observed a large miniature, which deserves attention, both on account of the individual represented, and the beauty of its execution. It is the portrait of Mr. F. K. Huger, who may be called Lafayette's deliverer, although his bold attempt to release him from the prisons of Olmütz was not crowned with success. You, no doubt, know, that this worthy son of Major Huger, of South Carolina, at whose house Lafayette was a guest, at the period of his first visit to America had the generosity to give himself up, in order to facilitate the escape of Lafayette and Bollman. I shall never forget the vivid and agreeable emotion which I felt on seeing this portrait for the first time. It is said to be a striking resemblance. The forehead of Mr. Huger is broadly developed, and characterized by a noble expression. The face is oval, slender and high complexioned; the nose rather prominent, and the lips thin. The eyes, which are blue approaching to gray, are full of expression. The ensemble of this fine countenance bespeaks a man of fine feelings, elevated soul, and determined character.

The portrait is surrounded with a gold frame, decorated with rose-boughs, and other ornaments, in excellent taste, and enclosed in a box of massive gold. It was presented to Lafayette in 1825, by

¹Pages 177 and 178.

the city of Charleston, as may be seen from the following inscription, which is placed behind the box, and surrounded with a carved gold frame.

Francis K. Huger
presented to
General Lafayette
By the City of Charleston
through
Samuel Prioleau,
Intendant.
1825

Made by Fletcher and Gardiner, Phila.

Towards the end of his life Huger returned to Charleston where, surrounded by his family and friends, he died on February 14, 1855 at the age of eighty-one years. A memorial celebration to Huger, who has always been remembered for his heroic attempt, was held in the Medical Hall of the University of Pennsylvania, November 5, 1909, and at this time a number of addresses were delivered and a medallion in bronze placed in the main entrance of the Medical School of the University.

Bollman came to America in 1796 where his attempted rescue of Lafayette accorded him a cordial reception. He travelled through a number of States seeking an occupation which he found in Philadelphia. He married and it was here that his two daughters were born. When, after several years he failed in his business efforts, Jefferson, whose friendship he had gained, offered him in succession the Consulate at Rotterdam, the Commercial Agency of San Domingo and the Indian Agency at Natchitoches, Louisiana. In 1807, he became deeply involved in the Burr conspiracy as a confidential agent and as such attempted to interest prospective settlers in the settlement of the Bastrop Land Grant and detaching Texas from the Union. He was entrusted

with a copy of Burr's famous cipher letters, which he delivered to General Wilkinson at New Orleans. Shortly afterward he was arrested by military authority along with his fellow messenger Samuel Swartwout and was taken to Washington where they, on the evidence afforded, were remanded to prison. On a writ of habeas corpus, they were brought before the Supreme Court. Chief Justice Marshall in reviewing the case laid down some of the principles that afterward guided him in defining the term "treason." The collapse of the case against Burr saved Bollman from serious consequences. It is interesting to note that during these troubles Lafayette's gratitude made him utilize every effort in his power to aid Bollman. It was evident, however, that Lafayette had never appreciated Bollman's part in the attempted rescue as much as he had Huger's.

Bollman was the author of certain pamphlets dealing with the banking system of the United States (1810-1816). Following this he resided in London for some years where he likewise engaged in the publication of documents upon the banking system of England and in a presentation on Ricardo's theories. He died in Jamaica December 9, 1821, at the age of fifty-two years.

And thus we are again attracted to this great figure in history. Lafayette, the Nobleman, General and Statesman, a man of rare attainments and of marvelous personality, who wielded a most remarkable influence over two continents and whose life was likewise interwoven with unusual and interesting medical incidents.

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CALIGULA

OR HISTORY'S DEBT TO SYPHILIS*

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IF anyone should contend that the force of gravity did not exist before Newton defined its laws, he would be considered as mentally unbalanced. This position, however, is about as reasonable as to assert that syphilis did not exist in Europe before Columbus discovered America.

No other profession claiming to be learned profits so little by the work of its "old masters" as does our own. Surely it must be the unpardonable sin to be profligate of the intellectual output of our forebears.

No disease throws so much light upon sacred, profane, social and political history as does syphilis, and it is one of the remarkable failures of our profession that its members, many of whose names are illustrious, have chosen to place us physicians in the position of being unable to reason correctly upon the diseases of antiquity by refusing to see the infallible signs of syphilis in medieval and ancient pathology.

It is not our purpose to rehash evidence shown by epidemiology and history of the ancient ancestry for Europe, Asia and Africa of this age-old malady. Suffice it to say that the "smoke-screen" to diagnostic accuracy put down by leprosy, leishmaniasis, lupus, psoriasis, sycosis and scabies was sufficient up to A.D. 1500 to befuddle the diagnostic efforts of physicians trying to bring order out of confusion.

Before A.D. 1471, when the first book was printed, all knowledge was provincial in character and subject to destruction by the hazards of war and pestilence. "Printing has secured the intellectual achievements of the past, and furnished a sure guarantee of future progress."¹

Before the decade 1840-50, when anesthesia was discovered, further progress in scientific medicine was impossible, because the giving of unnecessary pain is so revolting that it completely dampens research. Without research in medicine, there was little progress that could be made and nothing new to record by that wonderful discovery, the printing press.

In proof of this it is only necessary to cite the lurid therapeutics "executed" upon our illustrious first President, General Washington. He was blooded, blistered, sweated, made to vomit, purged and pestered for his "cynanche trachealis" until his great soul passed out. From a rather close reading of the available material upon his treatment in 1799 and from a fair knowledge of Sydenham and of Hippocrates, I am convinced that the Father of our Country received treatment during his mortal illness exactly similar to that which would have been administered had he been a patient of Thomas Sydenham in 1666 or of Hippocrates, the Father of Medicine, in the year 400 B.C.

Before Experimental Medicine was made possible by anesthesia, much of

* Read at the Annual Meeting of the American Association of the History of Medicine, Atlantic City, May 2, 1932.

the real knowledge of it came from midwives, savages, barbers, prostitutes and old women. To convince ourselves let us recall (1) that William Withering got the tip from a grandame of Shropshire that foxglove was good for dropsy; (2) that the Spanish *padres* learned from the Peruvian Indians how to cure the fever which was prostrating their viceroy; (3) that Saliceto in 1269 learned from the prostitutes of his day that syphilis followed "*coitus cum meretrice*," and (4) that Edward Jenner utilized the folk-knowledge of England, Germany and France, indicating that dairymaids who had suffered from cowpox could not take smallpox. Nor is it a credit to us physicians that a knowledge of such potent plants as the deadly nightshade, jimson weed, foxglove and many others was for centuries the private possession of professional poisoners. Nor should it make us proud to remember that a specific for at least two fatal diseases (leishmaniasis and schistosomiasis) has been carried in our cure books for centuries, performing the menial task of making us vomit or as hive-sirup curing our croup, when as a matter of fact it was a prince among pharmaceuticals. I refer to tartar emetic.

With these acknowledged failures staring us in the face, there really is nothing to wonder at in the fact that many of our confrères persist in their plea that syphilis found its origin in America. This teaching has disastrous effects, however, upon the history of medicine, the history of the human race and upon the physicians' ability to reason correctly upon pre-Columbian pathology.

A few items of direct proof of the Eurasian ancestry of syphilis cannot

be lightly put aside if we are to face the facts:

(a) Celsus in the 1st century described hard and soft genital sores.²

(b) Aretaeus in the 2nd century described gangosa (caused only by syphilis) as clearly as many modern descriptions of it.³

(c) Antyllus of the 1st and 2nd centuries described and perfected a technique for the cure of aneurysm, which was the accepted surgical treatment of that condition for fifteen centuries.⁴ Aneurysm was therefore common among the Romans. It is nearly always of syphilitic origin.

(d) The fact already referred to that Saliceto recorded in the year 1269 (200 years before it was printed) that syphilis was contracted from coitus with an infected woman.⁵

(e) Dürer's woodcut of the "First Syphilitic" bears the date 1484 in the Zodiac over the Coat of Arms of the City of Nuremberg (see Fig. 1). This is interpreted as the ill-starred date when syphilis first appeared at Nuremberg.

(f) Lastly we are assured by Philippe Ricord that Pope Alexander VI, who died in 1503 and Henry VIII and Francis I, both of whom died in 1547, had for years previous to these dates suffered from syphilis. It is unlikely that the first mentioned could have suffered long with it if the disease had been imported from America in the spring of 1493. It is well known, says Jourdan, that syphilis spared no one member of the incestuous families of Alexander VI, many of whom even died of it.⁵

Sexual debauchery either individual or national has ever been followed by disaster. From the beginning of recorded history there are scores of examples of this. Perhaps the most pronounced example is that of Im-

perial Rome from the reign of Tiberius (14-37) to and including that of Elagabalus (204-222). To those inter-

Their chambers or cells were generally below ground, and arched like an alcove (*fornix*), and hence the derivation of



FIG. 1.

ested in this, the parietic period of Rome, I commend the reading of the Historical Introduction to that classic of Ricord's entitled "Illustrations of Syphilitic Disease," published in 1851 at Philadelphia by A. Hart. We will quote two or three paragraphs:

The prostitutes of Rome were called she-wolves (*lupae*), and their houses lupanaria, in allusion to the suckling of Romulus and Remus by a she-wolf.

the word fornication, or illicit commerce of the sexes. To these disgusting receptacles did Messalina, the wife of the imbecile Claudius, repair, under the name of the courtesan Lycisca. She appeared naked, wearing golden necklaces, ogling every one who came in, and abandoning, "lassata sed non satiata," to the embraces of the lowest, especially of vigorous muleteers and porters, the bosom which had borne Octavia and Britannicus . . .

Courtezans, before exercising their calling, were obliged to declare their intentions to the aediles and magistrates, who inscribed their names in an appropriate register. The neglect of this regulation was punished with a fine and sometimes with exile. Corruption at last became so general that women of high rank did not shrink from this dishonorable declaration, which gave them license to assuage their passions. To so great a degree, indeed, were their excesses carried, that the Emperor Tiberius prohibited, by an edict, the wives of the knights from prostituting themselves, as also the public women from being carried on litters in the streets and public squares.

On the other hand, the emperors themselves gave an example of frightful luxury. Augustus had connection with the wives of the most illustrious personages, and committed incest with his own sister Julia. His courtiers, and the Empress Livia herself, procured for him married women and young virgins. During the day, Tiberius preached morality, and spent the night in drinking, served by naked girls; and, in addition, created a minister of pleasure. Caligula, who had just banished the pimps, violated Drusilla, one of his own sisters, and lived with all the others. He took great pleasure in exhibiting his wife naked to his friends, and in dishonoring the most distinguished women, in presence of their husbands. He imposed a tax on prostitution, and dared to establish a stew in the very palace of the Caesars, in order to increase his revenue. Domitian, who deprived prostitutes of the right of inheritance, bathed with them, and lived publicly with his niece, the daughter of his brother Titus. Lastly, Caracalla buried three vestals alive, after having violated one of them.

Thus, these crowned monsters, whilst affecting the greatest zeal for the purity of morals, wallowed in license and debauchery. Reeking with Roman blood, Nero and Caligula visited at night the stews and taverns, and spent the halcyon

days of their lives amidst the victims to their lubricity, of both sexes. Nero solemnly married the eunuch Sporus, dressed as an empress. He had already repudiated the unhappy Octavia and the infamous Poppaea. Commodus was seen publicly with a vile companion of his nocturnal orgies, kissing him constantly on the mouth. The Empress Messalina married, during the life-time of Claudius, a consul whose senses had been captivated by her blandishments. Julia, the only daughter of Augustus, famous for her wit and beauty, was still more so for her licentiousness. Another Julia, the daughter of Titus, lived in open incest with her uncle Domitian, although she was married to Flavius Sabinus. If we may be allowed the expression, the reign of Elagabalus was the golden age of prostitution. He protected its agents, and loaded them with imperial favor.

With such conditions of debauchery as this, could any force under Heaven save the Romans from all those serious sequelae that flow out of syphilitic infection. It could not and it *did* not.

Much of the history of the time was made by those suffering from syphilis and general paralysis. One cannot read the history of Gaius Caligula (12-41) as told by Suetonius, that master of short descriptive history, without feeling that if Caligula had not died by the dagger of Chaerea, he would have fallen to the Treponema before many months. Caligula lived twenty-nine years and ruled forty-six months and eight days. He began his reign as the popular idol of all classes. Suetonius describes his grandiose stage in these words:⁶

So much for Caligula as emperor; we must now tell of his career as a monster. "After he has assumed various surnames (for he was called "Pious," "Child of the Camp," "Father of the Armies," and "Greatest and Best of Caesars"), chancing to overhear some

kings, who had come to Rome to pay their respects to him, disputing at dinner about the nobility of their descent, he cried:

"Let there be one Lord, one King."

And he came near assuming a crown at once and changing the semblance of a principate into the form of a monarchy. But on being reminded that he had risen above the elevation both of princes and kings, he began from that time on to lay claim to divine majesty; for after giving orders that such statues of the gods as were especially famous for their sanctity or their artistic merit, including that of Jupiter of Olympia, should be brought from Greece, in order to remove their heads and put his own in their place, he built out a part of the Palace as far as the Forum, and making the temple of Castor and Pollux its vestibule, he often took his place between the divine brethren, and exhibited himself there to be worshipped by those who presented themselves; and some hailed him as Jupiter Latiaris. He also set up a special temple to his own godhead, with priests and with victims of the choicest kind. In this temple was a life-sized statute of the emperor in gold, which was dressed each day in clothing such as he wore himself. The richest citizens used all their influence to secure the priesthoods of his cult and bid high for the honour. The victims were flamingoes, peacocks, woodcock, guinea hens and pheasants, offered day by day each after its own kind. At night he used constantly to invite the full and radiant moon to his embraces and his bed, while in the daytime he would talk confidentially with Jupiter Capitolinus, now whispering and then in turn putting his ear to the mouth of the god, now in louder and even angry language; for he was heard to make the threat: "Lift me up, or I'll lift thee." But finally won by entreaties, as he reported, and even invited to live with the god, he built a bridge over the temple of the Deified Augustus, and thus joined his Palace to the Capitol. Presently, to be

nearer yet, he laid the foundations of a new house in the court of the Capitol.

Caligula's expedition to Britain is a series of incidents showing his mental deterioration and culminating in the fiasco described by Suetonius:⁷

Finally, as if he intended to bring the war to an end, he drew up a line of battle on the shore of the Ocean [at Boulogne on the English Channel] arranging his ballistas and other artillery, and when no one knew or could imagine what he was going to do, he suddenly bade them gather shells and fill their helmets and the folds of their gowns, calling them "spoils from the Ocean, due to the Capitol and Palatine." As a monument of his victory he erected a lofty tower, from which lights were to shine at night to guide the course of ships, as from the Pharos. Then promising the soldiers a gratuity of a hundred denarii [about \$16.00] each, as if he had shown unprecedented liberality, he said, "Go your way happy; go your way rich."

Perhaps every physician in this audience has witnessed the havoc a paretic may work before a diagnosis can be made and the victim brought under treatment. Rome had no means of bringing her Caligula under control, except by killing him. She administered the correct treatment under the circumstances.

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PSYCHIATRY IN HISTORICAL RETROSPECT

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PART I *

INTRODUCTION

EVERY physician, and particularly the specialist, should, in my opinion, possess a practical knowledge of medical history. It is certainly highly essential for the neuropsychiatrist, if he wishes to be a master of the medium with which he works, not only to be familiar with the views of the ancient writers, but he must also be able to trace the activities of those men who blazed the trail, so to speak, through the ages that are past. Then, too, it is extremely difficult to fully comprehend any scientific discipline, or line of thought, unless its source and origin be known. This is especially true of the new biological psychiatry, a branch of medicine that is just coming into its own and that is assuming greater significance in the general scheme of things as time goes on.

Following a similar tradition established in recording the annals of mankind, we shall divide the history of psychiatry into a few great epochs, and shall date the major periods in its evolution from outstanding persons or events. A division of this kind serves to mark the logical growth of this specialty, step by step, and keeps it undetached from medicine in general. It should be borne in mind, however, that there is considerable overlapping. The various periods are spoken of and named more for pragmatic purposes than anything else. They must not be taken too literally, therefore, because

they are by no means separated by well-defined boundaries.

I thought it best not to distract the attention of the reader with literary footnotes. Neither has it seemed advisable to give citations in the text of references to authors. There is appended, however, a complete list of books and authorities on which I have drawn, and, as a matter of fact, leaned rather heavily, and which the student who would know more of the subject would do well to read. I wish to acknowledge my indebtedness to the writers whose works I have consulted.

PRIMITIVE EPOCH

(5000 TO 600 B.C.)

The first stage in the development of psychiatry may be called the Primitive Epoch. It began with the dawn of the earliest civilizations, approximately in the year 5000 B.C., and extended down to the year 600 B.C.

In the oldest empires known to us, namely, Sumeria, Accadia, Babylonia and Assyria, sickness was regarded as the work of demons that swarmed in the air, earth and water. Few or no descriptions of mental diseases appear in the records of these people. It seems likely, however, that psychotic disturbances were not only prevalent in the countries just mentioned, but also that they exhibited essentially the same phenomena as occur in modern times.

* Part II will appear in the January, 1933, issue of the ANNALS.

Our chief knowledge of Egyptian medicine is derived from the Ebers Papyrus, which was written about 1550 B.C. This is mainly a collection of receipts. It contains, however, some very remarkable passages relating to diagnosis, and, in addition, it emphasizes the supposed supernatural origin of disease. It is in this classic of antiquity that we find our first real acquaintance with insanity. In it, the action of evil spirits in causing madness is mentioned; senile decay is graphically outlined; and the alcoholic psychoses are accurately described. Melancholia and hysteria were also known in early Egypt, the latter condition being considered contagious.

The first figure among the Hebrews, and in authentic history, as a matter of fact, to present clear and unmistakable signs of mental aberration, was Saul, King of Israel, who lived from 1097 to 1058 B.C. He became mad because he disobeyed divine injunctions, wherefore, "the spirit of the Lord departed from Saul and an evil spirit from the Lord troubled him." According to the Scriptures, he suffered with recurrent attacks of melancholia, alternating with periods of excitement, during which he exhibited homicidal tendencies. He finally committed suicide by falling upon his own sword.

It is interesting to note, at this time, that David was the first person to simulate insanity. The Bible relates that "he changed his behavior before them, and feigned himself mad in their hands, and scrabbled on the doors of the gate, and let his spittle fall upon his beard." This same prophet also knew something of the therapeutic effect of music on the mad-man, because, "it came to pass, when the evil spirit from God was

upon Saul, that David took a harp and played with his hand: so Saul was refreshed and was well, and the evil spirit departed from him."

Nebuchadnezzar, whose reign stands out as the most illustrious in the history of Babylonia, was insane for seven years. We read that "he was driven from men, and did eat grass like oxen, and his body was wet with the dew of heaven, till his hairs were grown like eagles' feathers, and his nails like birds' claws." His psychosis, in other words, assumed that form which in almost every age has been regarded as a frightful mental delusion, namely, the belief on the part of the individual that he is transformed into an animal, usually a wolf, dog or ox. Later on the term of lycanthropy was applied to this particular type of insanity, of which this ruler appears to be the first recorded case.

The early Greeks, before the advent of Hippocrates, believed that the various malevolent spirits and infernal deities who inhabited the earth, sky, and lower regions, were capable of inflicting the different psychoses upon anyone they might select. This is well illustrated in the mythology of these people. Lyssa, for instance, who was the very essence and the personification of madness, sent a disease upon the hero, Hercules, which was characterized by grand mal convulsions and homicidal mania, or in other words, epileptic furor.

Such an archaic psychiatry is inherent in all the Greek dramatists, as well as the philosophers, who write of this period, insanity being referred to by them as "the ancient wrath." The pages of the poets, especially Homer, are also filled with many references to mental diseases. This author mentions the state of anger

to which Bellephoron was reduced by the anger of the gods; describes the mad rage of Hector and Achilles; and represents the nurse, Eurycleia, as being driven frantic and distraught by the furies. In addition, Sophocles gives a very vivid account of the insanity of Ajax.

Our knowledge of the early Hindus is revealed through the Vedas or "Works of Wisdom." The fourth, or Atharva Veda, written about 700 B.C., and later supplementary Vedas, are the most important from the standpoint of medicine, but inasmuch as they contain few or no descriptions of mental diseases, we shall pass them by with no further comment.

References to insanity are likewise apparently scant in the early classics upon which Chinese medicine is based. The same thing is true of the Japanese writings. It should be mentioned, however, that disease in both these empires was thought to be the result of "an influence" of some sort. The presumption is, of course, that psychotic disorders were looked upon in the same way.

While no special articles on psychiatry, or on insanity, as such, appear in these ancient records, the conception of mental diseases found among all primitive peoples may be described as the demonological. The causative factors were considered to be of various kinds. They included devil-born demons, ghosts of the dead, spirits of slain animals, and human enemies. These agencies did their damage, either through their own supernatural powers of casting spells, or through the direction of the gods, to aid in wreaking vengeance upon man for his manifold shortcomings and sins. The insane individual was either revered as a holy person, or

else was thought to be possessed by a malignant devil, depending upon whether he had religious delusions, or was guilty of blasphemy as a result of his psychosis.

During this period, the practice of medicine was entirely in the hands of priests or priest-physicians, who claimed to be able to interpret the will of the unseen gods and goddesses. As a result of this, the ignorant and superstitious masses believed them to be the possessors of the most potent charms and therapeutic measures. These healers attempted to cure diseases of all kinds, including the psychoses, by various mystic processes, incantations and exorcisms. Among other things then in vogue may be mentioned the practice of making the body as unpleasant as possible for the intruding spirit or demon. This was accomplished by squeezing, beating, starving, or fumigating the individual. Prayers and sacrifices, usually in the form of burnt offerings, were also used, with the hope of appeasing the wrath of the gods. It will be seen, therefore, that the earliest therapy was essentially psychic in its approach.

GRECIAN ERA

(600 TO 146 B.C.)

The second period in the development of psychiatry began with the birth of the Grecian school of medicine, about the year 600 B.C., and ended with the destruction of Corinth in the year 146 B.C.

Pythagoras, who was born in 580 B.C., and who died in 510 B.C., was one of the most illustrious writers of this epoch. He spent the latter part of his life at Croton, a great Achaean colony in Southern Italy, famous in antiquity for its healthy location, fair women

and strong men. There he taught that the cause of disease rested with demons and other mystical beings. He emphasized the importance, however, of understanding the structure and the functions of the body. His therapy, being derived from Egypt, where he had traveled extensively, was quite advanced. It consisted of leisurely strolls, amusements, discourses in the temples, reading, and cold bathing. Particularly did he advocate a strict system of dietetics. He also thought well of the curative power of music and the mysterious value of numbers. He recommended to his pupils a moral life, moderation, abstinence, and occupation. While there is nothing specific in his works relating to psychiatry, his philosophical doctrines were of tremendous influence in the formation of the theories of later alienists.

Alcmaeon, of Croton, a pupil of Pythagoras, described the brain as the organ of thought, taught that it gave origin to nerves, and pronounced it the seat of the soul. He held that all patients were accessible to reason and hence put no emphasis on restraint.

Empedocles, of Agrigentum, living from 490 to 430 B.C., is mentioned here because he introduced into philosophy the four qualities, heat, cold, moisture, dryness, and the four humors, blood, phlegm, black bile, and yellow bile, which underlie all of the Greek medical systems.

The greatest figure of these ancient times was Hippocrates. He was born in the year 460 B.C., on the island of Cos, into a world of active speculation, where philosophy and medicine were inextricably entangled. He traced his ancestry back to Aesculapius himself. Living in the Golden Age of Pericles,

a contemporary of the most brilliant group of men known to history, this famous physician did so much to emancipate the art of healing from superstition and ignorance, and to make it a scientific study, that he is justly called the Father of Medicine. After setting up the highest standards of professional conduct, attainment, ethics, and ideals, which have been handed down through the ages, he died in the year 370 B.C.

There are no works in Hippocrates devoted exclusively to psychiatry. This branch of medicine, however, was not neglected by him. He was the first to express the opinion that mental diseases arose from abnormalities of the brain. In accordance with his humoral pathology, he believed that these latter were due, either to changes in the normal proportion of the four humors of the body, namely, black bile, yellow bile, blood, and phlegm or mucus, or else to acute and chronic diseases of the different organs. He mentioned heredity as an additional causative factor. He distinguished between mania, melancholia, and dementia or paranoia. He was familiar with epilepsy and hysteria, although his ideas concerning the latter were rather crude. He described phrenitis, which is the possible fever delirium of any infectious disease, and finally, he recognized borderline conditions and feeble-mindedness. He advocated an eliminative therapy. Hellebore, bleeding, emetics, rigorous diet, and rest were the principal requisites in the cure of a case.

The immediate successors to Hippocrates offer little of interest for our purpose. Most of their books have been lost, while those which still exist contain practically no new information of value. In general, it

may be said that the point of view revealed in their writings shows the influence and reflects the teachings and natural philosophy of Plato and Aristotle. Neither of these two famous Greeks should be overlooked in any historical sketch of medicine, despite the fact that they were primarily not physicians.

Plato was an Athenian, born in 428 B.C., of a distinguished family. He became a disciple of Socrates at the age of twenty, and after the death of his master, he traveled in Egypt, Sicily, and elsewhere, returning to Athens about 388 B.C. There he established his school of philosophy in a garden near a gymnasium, called the Academy, and there he spent the last forty years of his life. He taught that symmetry between the body and the soul was of the greatest importance to health. According to him, mental diseases resulted partly from somatic and also from moral causes. He was an advocate of the humoral pathology of Hippocrates. He believed also in the influence of the divinities. He did not stress the actual treatment of the psychoses, but stated that the best protection against insanity was a suitable mode of living, development of physical strength, and education of the mental faculties.

Aristotle, who closely follows the time of Plato, his preceptor and teacher, lived from 384 to 322 B.C. He was the founder of comparative embryology, contributed much to physiology, and was the second greatest scientist of the Hellenic Golden Age. He examined the normal natural history of the mind and emphasized its importance for the whole organism. He taught that the seat and cause of all disease processes is to be sought in the body itself. He knew mania and

melancholia, contrasted acquired with congenital conditions, and pointed out the tendency of the epileptic patient to commit criminal acts. He was not an epoch maker for the development of practical psychiatry and he offers no special treasures in this field. As a matter of fact, his locating the soul in the heart, as he did, and his conception of the entelechies, instead of advancing this specialty, retarded its further progress.

With the final exhaustion of the Greek creative impulse, the scene shifted to Alexandria, the capital of Egypt. There Ptolemy I, and his descendants, concentrated the culture of the East and West, and made that city the center of Greek science, including medicine, and the intellectual metropolis of the world, a position which it maintained for nearly a thousand years. A library and annex was founded about 300 B.C., which contained seven hundred thousand volumes. In connection with the library was a museum, a botanical and zoological garden, and a chemical laboratory. In addition, a medical school, where anatomy was systematically taught for the first time in history by dissection of the human body, was established and became famous. There the spirit of Hippocrates dominated the minds of the students.

It was in Alexandria that Herophilus, a Greek of Chalcedon, who lived from 335 to 280 B.C., carried out his profound neuro-anatomical researches. He defined the brain as the central organ of the nervous system, distinguished between motor and sensory nerves, described the sinuses and the ventricles, and mentioned the torcular Herophili. He revered Hippocrates and maintained his humoral pathology.

Erasistratus, a rival and contemporary of Herophilus, was born on the island of Keos in 310 B.C., and died in 250 B.C. He studied anatomy after he came to Alexandria and wrote a treatise in which particular attention was paid to the structure of the brain. He placed the soul in the cerebellum. He had considerable skill in diagnosing the psychoses and was often called upon to do so as court physician to Seleukus Nikator of Antioch. He rejected the humoral pathology of Hippocrates and founded a system of his own.

Despite the researches in anatomy and physiology, the dawning organic concepts, and the association of insanity with somatic changes, which characterized this age, magic, religion, and folklore still played their part in therapy. The treatment of mental diseases was an uneven mixture of the physical and the psychic, but inasmuch as the latter predominated, the essential approach to the problem remained psychologic.

ROMAN ERA

(146 B.C. TO 476 A.D.)

With the destruction of Corinth in 146 B.C., Hellenic medicine migrated to Rome. This marked the beginning of the Roman Era, which extended down to the fall of the Western Roman Empire in 476 A.D.

Asclepiades, one of the most successful practitioners of this period, was born at Prusa, in Bithynia, in the year 124 B.C. He was the son of well-to-do parents and traveled extensively. He studied medicine and philosophy in Athens and Asia Minor and pharmacology in Parim. He came to Rome as a young man, and was distinguished, not only for his medical skill, but also for his oratorical powers.

He introduced into medicine a system of his own, which was important because it subsequently became the foundation of methodism. Believing that disease was due to a blocking of the pores of the body, his remedies were directed to keeping them open. He accomplished this by changes in diet, friction, bathing and exercise, but he also employed emetics and bleeding. These measures were applied to the insanities as well as to other diseases. In addition, he sought to cure his patients with music, pleasant surroundings, plenty of sunlight, and similar sympathetic influences. He advised against restraint. He differentiated between hallucinations, illusions and delusions. Because of his clear-cut ideas concerning the psychoses, as well as his advanced methods in treatment, he has been called the Father of Psychiatry.

Although he was not a physician, mention should be made at this time of Marcus Tullius Cicero. This greatest of Roman orators was born at Arpinum in the year 106 B.C., and died in the year 43 B.C. His contribution to psychiatry was his separation of true insanity from imbecility and idiocy and his insistence that the weakminded and stupid were patients just as the demented and frankly psychotic individuals were. He also believed that the raving man should be deprived of the right to manage his own property.

Aurelius Cornelius Celsus, who lived from 14 to 41 A.D., gave the most complete picture which we have of medical thought and activity in Roman times. He likewise was probably not a true practicing physician. He flourished in the reigns of Tiberius Caesar and Caligula, and compiled encyclopedic treatises on a variety

of subjects. The Latin text of his work on medicine, "*De re medicina*," is a translation of some Greek original. It contains separate chapters on the treatment of nervous diseases, and a detailed discussion of the different types of insanity then known. For this reason, he deserves the honor of being designated the first writer on psychology. His therapy, however, left a lot to be desired. It consisted in tormenting, torturing, and flogging his violent patients, as well as bleeding, starving and purging them. On the other hand, he did all that he could to divert the melancholic cases from their sadness by insisting upon their indulgence in some form of exercise.

Soranus, of Ephesus, who was trained at Alexandria, came to Rome during the reigns of Trajan and Hadrian, in the second century A.D. He described certain stuporous states, which were probably catatonia, and observed other cases corresponding to our picture of dementia precox, although they were not separated out clinically.

Little or nothing is known of the personality of Aretaeus, the Capadocian, another clinician of the second century A.D. The exact time of his life is difficult to determine, but it seems most likely that he lived in the time of Nero, around the year 80 A.D. His writings show an originality of thought, breadth of view, comprehensiveness and clearness found only in Hippocrates. He differentiated between cerebral and spinal paralyses, indicated the decussation of the pyramids, described the *aurae* of epilepsy, and encompassed, after a fashion, senile and involutional states. In addition, he dwelt at length upon the symptoms of apoplexy, the various

manifestations of hysteria received recognition, and he was the originator of the idea of a circular psychosis.

It is Claudius Galen alone who has vied with Hippocrates in the annals of medical history. This eminent authority was born at Pergamus, in Mysia, about 130 A.D. He received his early education from his father, Nicon, and at the age of sixteen he began the study of medicine. In his twentieth year he placed himself under the instruction of the anatomist and physician, Pelops, and under the philosopher, Albinus, in Smyrna. He then visited other cities, returning from Alexandria to Pergamus in 158 A.D., and migrating a few years later to Rome. He brought with him a wealth of scientific information, and a skill in practice, which soon placed him at the head of his profession. He died at the age of seventy in the year 200 A.D., his principles and theories, although modified by mysticism and magic, holding sway throughout the Middle Ages.

The voluminous writings of Galen on every subject summed up the knowledge of the day. His neuro-anatomical discoveries were the best features of his work. Despite his first-hand information, however, of structure, and although his medicine rested on physiology, his conception of the central nervous system was exceedingly primitive. He believed that a *pneuma*, or life-giving force, took its origin in the two lateral ventricles of the brain, passed through the Sylvian aqueduct, and entered the fourth ventricle, from where, according to need, it was distributed to the various parts of the body. Galen contributed practically nothing to mental medicine, unless perhaps one may mention his elaboration of

those diseases dependent upon anemia and hyperemia, and his classification of causes into primary and secondary. As a matter of fact, Galenic psychiatry represents a retrogression rather than an advance, because many of his otherwise clear notions about the psychoses were vitiated by his religious views. He substituted a decidedly pragmatic system of philosophy for the plain notation of facts as taught by Hippocrates. The effect of his dogmatism upon after times was appalling.

The psychiatry of the Numidian, Caelius Aurelianus, of the fifth century A.D., was derived mainly from Soranus of Ephesus, whose work he paraphrased. He defined the duties of attendants, protested against chains, opposed venesection, allowed no violence of any sort, and prescribed exercise for his patients. He was full of sympathy for the insane and understood them thoroughly.

The physicians of the Eastern Roman Empire, in this era, were mostly industrious compilers, and contributed nothing new to psychiatry. The most famous of the encyclopedias produced was prepared by Oribasius, a friend and contemporary of Emperor Julian. He was born at Pergamus in 325 A.D., and died in 403 A.D. His work contained chapters on loss of memory, insomnia, nightmares, lovesickness, lycanthropy, abscess of the brain, heatstroke, hydrophobia and migraine. As far as his therapy was concerned, he recommended the use of hellebore as the moon was waning, distractions of all kinds, and cold bathing. His descriptions were thin and sketchy and the information they conveyed was more curious than valuable.

The great Roman Empire was finally overthrown in 476 A.D. by the German

tribes. Several factors contributed to its general disorganization. Among these were excesses in wine-bibbing and an increase in sexual perversions, which made life in the city of Rome a gigantic neurosis prior to its downfall. It was the persistent infiltration of the Christian faith, however, which was antagonistic to everything connected with the pagan world, and which was adopted by conquerors and conquered, that ultimately put an end to the long and uninterrupted progress of medical knowledge and practice.

DARK AGES

(476 TO 1000 A.D.)

The Dark Ages, as set down here, embrace the years between the fall of Rome in 476 A.D. and the beginning of the eleventh century, or the year 1000 A.D., and refer more particularly to the condition of affairs on the European continent. This period in the history of psychiatry has been referred to as the Epoch of Retrogression. It is marked by an almost total eclipse of the light of classical culture.

During this era, there developed and flourished in Europe, as a part of the foundation of the Church, the institution known as Monasticism. This term, in its widest application, denotes a life of austere self denial and seclusion from the world with the object of promoting the interests of the soul. While the services of the Monks to civilization were many, they construed the Bible literally, and cited and quoted passages therefrom which tended to confirm the belief of the ascetic that his existence of abstinence and isolation was the only way to win salvation. In addition, the Church Fathers drew a sharp line of distinction between the spiritual or mental aspect of man and his

physical nature, and actually taught that the former was worthy of regard, while the latter was hostile to the best interests of the individual. Christianity brought about a revival of the sacred or priestly type of medical practice, a fusion of religion and medicine, a restoration of primitive theories of disease, and the restriction of free thought.

As a result of the influence of the Church, supernatural aid came to be more and more esteemed, especially since medical art showed itself to be powerless in the face of the great epidemics. Physicians were not only humiliated, but were put to death if they failed to cure. Mad-men, believing themselves transformed into animals, took to sequestered places, committed acts of violence, and behaved like beasts of the forest. This complete loss of personal identity, accompanied frequently by the corresponding belief on the part of the beholders, is one of the most remarkable facts which the psychological history of our race reveals. In this preeminently psychotic age, it was accepted as gospel that vampires, succubi, incubi, and myriads of unseen creatures populated the earth, and made the soul and body of mankind their playground. The end of the world was considered imminent. Pent-up orgies of the flesh and the emotions were common. Trifling incidents were ascribed to the intervention of spirits and man was no longer master of himself. Such was life in Europe!

Throughout all these dark centuries the approach to the problem of insanity on the Continent was by way of the learned lore of demonology. The prevailing method of dealing with victims of mental disorder made use of such devices as exorcism, charms,

amulets, torture, and the stake. A demented person was held responsible for his condition. The devilish possession was deemed to be unmistakable evidence of wickedness. It was thought to be the duty of the magistrate and the populace to combat the internal reign of Satan by chastisement from without. That this notion continued until modern times will appear from the records of the witch trials in England and our own colonial days. On the other hand, certain visions and trances, which are of common occurrence in insane patients of today, were regarded as the result of an intimate communion with the Deity, and the subjects in whom they occurred were revered and esteemed.

Not only did medicine in general degenerate during the Dark Ages, but the very deplorable state of psychiatry in Europe is clearly shown by all the books upon the history of civilization that treat of this period. It is true that we find reports of mental disorders, even of those that occurred in epidemic form, such as the dance manias and lycanthropy, but nothing scientific appears during these benighted years.

It should be noted, however, that under the slightly less disturbed conditions of the Eastern Empire, several men of unusual ability collected, translated and arranged the writings of the ancients. They also urged a return to reason, but their voices were not heard, and if they were, they were certainly not heeded. Brief mention will be made of a few of these.

One of the foremost physicians of this group was Aetius of Amida in Mesopotamia. He was born in 527 A.D., and died in 565 A.D. He held the title of count at the Byzantine Court, probably under Justinian I. He followed the psychology of Galen. He

distinguished three kinds of phrenitis, depending upon whether the imagination, reason or memory was involved. In the first instance, the anterior part of the brain, in the second the middle, and in the third the occiput, was the seat of the lesion.

Perhaps the greatest of the Byzantines was Alexander of Tralles. He was a contemporary of Aetius and lived from 525 to 605 A.D. He practiced medicine for a considerable time in Rome. He treated hysteria and the psychoses humanely, recommended purgatives and baths for excited patients, and insisted that the brain was the seat of the soul, as well as the organ involved in mental diseases.

Still another belonging to this period was Paul of Aegina, who lived in Alexandria in the middle of the seventh century and who reached the pinnacle of his fame in the year 630 A.D. Although he presented nothing new, and repeated word for word the opinions of his predecessors, he did protest against the practices then in vogue with regard to handling and treating the insane.

About this time stirring developments of tremendous importance and significance were taking place elsewhere. In the year 632 A.D., there issued from the deserts of Arabia a people not entirely uncivilized, though classed as barbarians by their neighbors. Within a century they annihilated one of the great existing empires and inflicted a deadly blow on the other. After conquering Persia, and stripping Eastern Rome of her fairest provinces, they threatened the very existence of the younger nations of the West, until their career of conquest was checked by Frankish valor at

Tours in 732 A.D. This display of physical vigor was followed by an intellectual activity hardly less wonderful. The Arabian writers represented the highest form of civilized medical science then in existence. During the remaining years of this period, from 750 A.D. to its close in 1000 A.D., they devoted themselves almost exclusively to translations.

Rhazes, born in Rai, was the first and most original of the great Moslem physicians. He lived from 850 to 932 A.D. He recommended the game of chess as a cure for melancholia.

Ahmed Ben Toulun, the first independent ruler of Egypt, founded a hospital there in 874 A.D., which cost thirty thousand pounds. It contained two baths, for men and women, and a department for the insane. He visited it every Friday, the Moslem sabbath, until a lunatic threw an apple at him, and then he called no more.

Before leaving the Dark Ages, mention should be made of the town of Salerno, which was beautifully situated on the Italian Coast, about thirty miles east of Naples. It was a favorite health resort of the Romans. In this period it became more attractive still to the sick. Its cathedral contained what were believed to be the wonder-working relics of St. Matthew. In the ninth century we hear of distinguished Salernitan physicians, while in the tenth, we find one of them in the French Court. Bishops and nobles traveled from great distances to Salerno to seek medical aid. It also was a mecca for neurotic and insane individuals, some of whom were thought to have been miraculously cured, principally by prayers.

(To Be Concluded)

THE LIFE AND TIMES OF DR. WILLIAM HARVEY

By SIR WILMOT HERRINGHAM, K.C.M.G., C.B., M.D., F.R.C.P.

HAMSTEAD, ENGLAND

PART V (CONCLUSION)*

The other brothers were all in trade. Two of them were members of the Grocer's Company. Daniel was admitted in 1611, having been apprentice to Thomas Weston, and was given a loan of £50 out of a benevolent fund formed to help young members to start in business. He was then twenty-four. Eliab was admitted, having been apprentice to Richard Piggott, in 1616. Both served on the Livery, Daniel in 1620, Eliab in 1631. Daniel was on the Court in 1625, was elected Sheriff in 1639, and Warden in 1640, but escaped both those burdensome offices by payment of the regular fine.*

Of the chartered companies which then monopolized foreign trade the oldest was that of the Merchant Adventurers. Their books are lost, and therefore we cannot tell whether the Harveys belonged to that Company or not, but there was a smaller company of Adventurers trading into France, with which Daniel and Matthew were connected, for when in 1626 and 1627 Charles' subservience to Buckingham, and Buckingham's private quarrel with France, led to the seizure of French ships, and this to confiscation of English goods by the French, the result was a long

negotiation by the merchants on either side, in the course of which Daniel and Matthew Harvey were accused by their fellow Adventurers of acting in fraudulent collusion with the French merchants. The charge was brought before the Privy Council on January 28th, 1628, but no more is recorded in the Council Register, so the matter was probably settled.³⁹

The other great companies were the Muscovy Company, to which apparently the Harveys did not belong, and the Levant and East India Companies to which they did. It is an amusing trait, showing the brothers to have been a close fisted set, that they always made difficulties about paying their "fines" or entrance fees.

Thomas and Daniel were admitted to the Levant Company as partners on November 18, 1616, and are described as "farmers of the preemption of Tynne." This is explained by a grant dated May 22, 1615 to Clement John and Thomas Harvey and Robert Charleton, citizens and merchants of London, of the preemption of all tin in the counties of Devon and Cornwall and elsewhere excepting that granted to the Pewterers for five years (*Cal. S.P. Dom. Jas 1.*). Daniel was abroad, and Thomas paid the fine, then £25, for the firm, on the understanding that, if one of the partners died, the survivor would be liable for a second fine. Thomas died in February, 1623, and the Company

* Mr. Hickman Barnes, Clerk to the Company, to whom I am indebted for this information, tells me that no Thomas Harvey is recorded within the required dates, nor is there any record of a Michael or Matthew Harvey.

* Parts I, II, III and IV of this article appeared in the ANNALS OF MEDICAL HISTORY, vol. IV, No. 2, p. 109, March, 1932; No. 3, p. 249, May, 1932; No. 4, p. 347, July, 1932; and No. 5, p. 491, Sept., 1932.

demanded Daniel's fine. He resisted and, though they at last excluded him from all trade outward and inward,

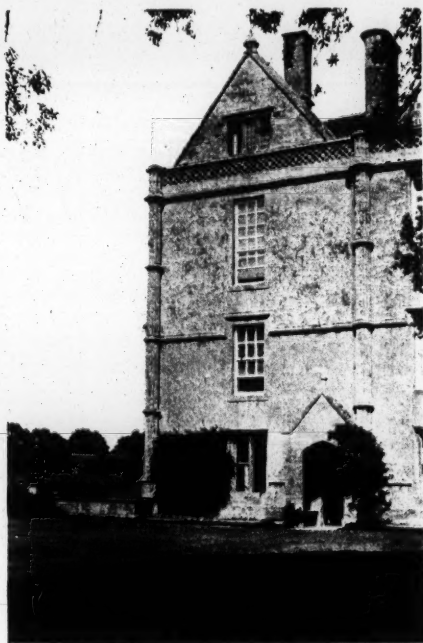


FIG. 5. CLIFTON MABANK, NEAR SHERBORNE. RESIDENCE OF MICHAEL, SON OF MICHAEL. PHOT. BY MRS. WILSON.

would not pay up until December, 1625. By this refusal he kept out of the Company Lewis Roberts,* an apprentice of Thomas, whom the Company would not admit until the

*Note on Lewis Roberts: When Daniel Harvey refused to pay his fine to the Levant Company on the death of his brother and partner, Thomas, his servant's petition (Lewis Roberts apprentice to Mr. Thomas Harvey deceased) for freedom of the Company "is not to be considered till the money is paid" (*Minutes of Levant Co., May 20, 1625*). On December 1, 1625, Daniel Harvey has paid £25, and Lewis Roberts is made a freeman. On July 8, 1630, Roberts is Assistant (i.e., on the Court of Directors), and on February 14, 1633 he is appointed Husband (Secretary and Manager). On July 2, 1638, he is styled Captain (no doubt of the City Trained Bands). He died in 1640. In 1638

fine was paid. On November 27, 1637, Eliab and Michael were admitted. The fine was then £50. They asked for remittance of part of it. No relief was granted to Eliab, but as Michael had been apprentice to Thomas, his fine was reduced to £25. In January, 1638, Eliab moved again, that since he and Michael came in as partners, part of the £50 and £25 might be remitted. In February, Daniel was elected Assistant, and on March 14, Eliab having now a friend on the Board, moved the same motion again. This time he obtained a remittance of £20.

he published a *Mapp of Commerce* (printed for Mapp, London) a large quarto with a fine frontispiece, dedicated to (1) Sir Morris Abbot, Ald., Governor of the East India Co. (brother of the Archbishop), and Henry Garraway, Ald., Governor of the Levant Co., and (2) to the six remaining brothers, William, Doctor of Physic, John Harvey, Esquire, Daniel, Eliab, Michael and Matthew, merchants, and to John Harvey onely son of Thomas Harvey, merchant, deceased.

In the preface Roberts states that he was a factor in Constantinople, and that the book was begun twenty years ago, "and traced out at the charges and expense of your loving brother and my deceased master, Thomas Harvey," since whose death the other brothers have helped him. "I have been so much assisted by your help, and helped by your assistance . . . that I had just cause to honour your love, and still persevere to love your honour." As was then the custom, there are several poems to the author at the beginning of the book, including one from a relation in Anglesey, whence Roberts came. The book contains descriptions of all ports and trading centers in four continents with the commodities obtained from, and required by, each, and a list of the coinage with the exchanges. It is a remarkable work.

In 1641 was published posthumously his "Treasure of Traffike." In it he shows the damage inflicted on commerce by high duties. He was buried March 12, 1640, at S. Martin's Outwich.⁴²

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FIG. 6. WILSON
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A similar scene occurred in the East India Company. In June, 1624, Daniel Harvey joined in a petition to the Court but £6, which, howbeit, they refused not, yet they wished that Daniel Harvey would ac-



FIG. 6. WINCHLOW HALL, NEAR HEMPSTEAD. MANOR HOUSE, PROPERTY OF ELIAB HARVEY. PHOTOGRAPH FROM AN OLD DRAWING PRESERVED AT SAFFRON WALDEN. THE HOUSE IS NOW DESTROYED.

King against the oppressive actions of the Dutch in the East Indies (*Cal. S.P., East Indies and Persia*, vol. 70). He was therefore a Member of the Company at that time. In 1628 he served on committees. On December 22, of that year,

... the freedom of the Company bestowed on Eliab, Michael and Matthew, brothers of Daniel Harvey, desirous to be adventurers in the new subscription for Persia, and the fine referred to their own voluntary dispositions, though it was conceived they could not give less than £10 to the poor box.

They not only could, but did.

On December 26, Eliab, Michael and Matthew Harvey were made freemen of the Company and took the accustomed oath, the Court

... expecting from them some reasonable fine in that respect, but they

quaint his brothers that the Court expected they would have enlarged themselves in a more bountiful manner, for the favour conferred upon them is not usually permitted to any under £20 a man.

Daniel Harvey was again elected assistant of the Levant Company in 1640, but there is no other mention of this generation of the Harveys in the Minutes of this Company, which are preserved in the Record Office.

They were more active in the East India Company. In 1625 and 1626 Daniel bought £5300 of the Company's Stock. In 1627 and 1628 he served on committees. On December 6, 1633, there is an amusing piece of sharp practice recorded of him. When ships came home the members bid for the cargo at so many months' purchase. Daniel proposed that the

Company should order the Treasurer to receive such moneys as he, Daniel, should bring in upon discount for

In 1635 Charles I was damaging the Company by granting licenses for trading to Endymion Porter and



FIG. 7. TILTON-ON-THE-HILL, SOUTH FRONT. RESIDENCE OF DANIEL HARVEY DURING THE WAR. FORMERLY BELONGED TO SIR K. DIGBY, NEAR LEICESTER. PHOT. BY MRS. WILSON.

pepper at 8 per cent, averring that it was better for the Company to receive its own money at 8 per cent discount than to borrow at 7 per cent, which was the usual rate at that time. Not unnaturally the Treasurer objected, and a committee reported against it. On December 9, "the Treasurer was desired to forbear taking in any more moneys of Mr. Harvey's on rebate of 8 per cent."

On March 19, 1634, Daniel claimed compensation on a deal of 150,000 lb. of pepper, on the ground that part of it was spoiled by wetting. The Company replied that he might take the pepper or leave it, but they would not pay any compensation. This represents a transaction of about £15,000, as pepper was worth about two shillings a pound. The year following he bought largely again and it is noted that his brothers and Lewis Roberts guaranteed him.

other courtiers, and the Company was in a bad way. The Governors were attacked by "the Generality" and Daniel Harvey was put on the Committee in 1636, probably to keep him quiet. In 1639 he is again on the committee. In 1640 an issue of new stock was not taken up, but in July of that year several ships came home, and the Company made enough to pay all its debts and had a surplus of £168,000. In August the King forced them to sell him 607,522 lb. of pepper at 2/1d per lb. deferred payment, and resold it at once for 1/8d. cash, leaving the company with nothing but promissory notes from Royalists, who soon became penniless. For one of them, the Earl of Darleton, who had been put down, unknown to himself, for £4000, Eliab became security.

This same year Daniel claimed on a parcel of silk for underweight, and

was allowed £60. In May, 1641, he was named on a Committee of Grievances. In April, 1643, the Company

trade, in which among other things Daniel told him of Portland's corruption, no doubt to Laud's great delight,



FIG. 8. WYKE MANOR, NEAR SHERBORNE. RESIDENCE OF WILLIAM, SON OF MICHAEL HARVEY. PHOT. BY MRS. WILSON.

was assessed at £35 weekly, as a contribution to the £10,000 which was exacted weekly from the City by Parliament. At the beginning of 1644 the Company had two stocks running, the first General Voyage Stock, 1641, which had already paid 125 per cent, and the fourth Joint Stock of 1642 which had not yet paid a dividend.

Clarendon gives an interesting account of Daniel's friendship with Archbishop Laud, who had been made Archbishop in 1633, and was placed on the Commission of the Treasury which followed on Portland's death in 1635. Laud was a good man of business, and never took up a piece of work without getting to the bottom of it. He had a country house at Croydon, and Daniel "who had the reputation of knowing more of trade than any other man in England," lived at Combe nearby. Laud made his acquaintance, and used to have long conversations with him about

for the two had been bitter enemies.⁴⁰

In 1641, Daniel and Eliab formed part of a deputation from the City to the House of Commons which presented a petition that the command of the City Militia might be put into the hands of the Lord Mayor as formerly, and not into those of the New Commissioners. But this petition found very ill acceptance in the House, and most of the petitioners were fain to retract what they had done.⁴¹

The City, which had clamored for war, was much disgusted at having to pay, for voluntary contributions having soon failed, Parliament began to levy money by the methods that were familiar, fifteenths or twentieths on movables, subsidies and assessments on land. The City was ordered to provide £10,000 a week. Many resisted payment, and among them were Daniel and Eliab. They were assessed as merchants in Dowgate

Ward at £1500 and £500 respectively, and on April 12, 1643, their goods had been distrained, and William

July 24, the Haberdashers Committee allows William Reynolds a month to pay what he has agreed for



FIG. 9. ROLLS PARK, ESSEX. PROPERTY OF ELIAB HARVEY. PHOT. BY MRS. WILSON.

Langhorn had paid the £2000 on their behalf. Ordered that the goods distrained be returned to Langhorn. On Nov. 10, 1643, Daniel's assessment was raised to £5000 and Eliab's to £2500. November 23, Daniel is to be taken into custody. December 18, his debtors depose to their debts, and are ordered to pay them to the Committee instead of to Daniel. April 5, 1644; all Daniel Harvey's rents, goods and estate to be seized and sold. May 31, he is committed to Lambeth House. On June 1, the House of Commons, at a loss for cash, resolved that the assessment of $\frac{1}{20}$ set upon Mr. Dan. Harvey, by the Haberdashers Hall Committee, be paid to Plymouth. On July 20 a petition by Daniel came before the House of Commons but was by them referred to the Haberdashers Committee, which was equivalent to rejection (*Journal of House of Commons*).*

* There is in the British Museum among Simons D'Ewes' MSS. (Harleian MSS. 370) an

Dan. Harvey's goods at Croydon. August 19, Daniel is to be sent by sea to Plymouth, and keep there till he has paid his assessment. September 20, his goods in Snelling's House, Broad Street, being those for which Langhorn had paid a year and a half before, to be discharged. A man called Biddulph, who owes Daniel £2,271 5s. is to pay it to the Committee. November 4, Trussell and Reynolds engaging for £1000 by next Friday, and that their master will abide by the Committee's order for the residue (evidently they have had hard work to get Daniel to yield), he is released from Lambeth. November 8, he has brought in £1000 which makes up a half (i.e., £1500 in Dowgate and £1000 to the Committee = half of £5000), the sequestration is taken off, and he is to have fourteen

account of this matter which seems as if it were a copy or abstract of Daniel's petition for redress. D'Ewes was M.P. for Sudbury at the time.

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days to treat about it. November 20, ordered to pay £500 in a month and be further heard (making £3000).

December 20, ordered to pay £1000 more in six weeks for which he shall have the Public Faith (apparently equivalent to Government Stock to that amount) and be discharged, and that ends Dan's troubles for the time.

Meanwhile, on December 20, 1643, Eliab's goods were distrained at Roehampton. July 1, 1644, Colonel West* having undertaken to pay for Eliab Harvey's goods at Roehampton appraised at £50, is to have fourteen days to pay in half. January 10, 1645, a reward is offered for the discovery of Eliab (who evidently had absconded). February 5, Eliab is to be brought in custody to pay his assessment. (But apparently he had not yet been caught for) February 7, Isaac Smith, Eliab's servant, is to be kept in custody and Susan Greenwell, his maid, to be committed to Bridewell, she refusing to be examined

* This Colonel West must, I think, be a son of Francis West, Eliab's father-in-law. A Francis West was Captain of the Blue Regiment of trained bands of All Hallows, Bread Street Ward. He commanded them at Newbury and Gloucester in 1643 and was highly praised, and promoted to Colonel, by Essex. The Blue Regiment petitioned that he might be appointed to them, but they had already a Colonel Adam. Essex therefore recommended West for employment in "some post worthy of his merit." May 2, 1645 he was appointed by the Mayor and Common Council to the Lieutenancy of the Tower, resigned by Pennington in compliance with the Self-Denying Ordinance. That year he was nominated as a Tryer for the appointment of Elders of the Church. When Fairfax marched into the City in December, 1647, he displaced West and put in a Colonel Tichborn, but West recovered his position on May 15, 1648 and died in possession of it in August, 1652. The officers of the Blue Regiment were granted leave to attend his funeral. (D.N.B.)

concerning her master, or to answer the questions of the Committee. February 14, Smith is to be released, Colonel West promising he shall appear when required. Colonel West, paying £85.17.8, the appraised value of Eliab Harvey's goods, is to have the same without interruption. Mr. Jarvis is to have £10.9.6 for seizing and appraising the goods, and searching for his person. February 21, Susan Greenway (sic) released. December 1, Eliab Harvey is to make up his half in fourteen days, and to be further heard; till he do this he is to be committed to Petre House. December 17, he is to be discharged on paying in £500 more than the £500 paid in the ward. December 26, if he will give security to make up what has been paid and levied to £1000, his assessment of £2500 for his twentieth to be discharged. February 9, 1646, he having paid in £100 more, and this Committee having further considered his estate, order that his assessment be discharged if he pay £200 more in eight days. February 27, certificate that he has paid £500 and £85.17.8. Finally, April 23, 1652, ordered Public Faith to Eliab for £885.17.8 paid by him as assessment for his twentieth. September 24, 1652, on proof that Dan Harvey had paid £1500 in his ward, and £2500 (to the Committee) for his twentieth, and on petition of Eliab his executor, and affidavit that £1360 was Daniel's full proportion, order that the Public Faith be allowed for £3000 of the £4000, paid without interest.*

* All of this is from Cal. S.P. Committee for Advance of Money. Parliament was almost as much in want of money as the King, and the power of the Army arose from the absence of money to pay the arrears without

But the Harveys did not confine their operations to pepper and silk.

At this time there was a large amount of land on the market. The Episcopal lands, the Cathedral lands, and lastly the Royal lands, were all up for sale, and an immense number of Delinquents' lands were sold also. In addition Delinquents who compounded were fined at one-tenth, and later at one-sixth of their capital value reckoned at twenty years' purchase, which usually came to double the total rental of the estate, very severe treatment since no land could be sold much, if at all, above ten years' purchase. Hardly any could find the money as they had subscribed this money and melted their plate for the King, and therefore they had to sell to provide the fine. For sharp business men there were great bargains to be had.

The first transaction of the kind, though this was not due to the conditions of the war, was a mortgage by Sir Kenelm Digby, of Tilton in Leicestershire and Stoke Drie in Rutlandshire to Daniel and Eliab in 1639 for £10,000. Daniel is described as "of Tilton" during the rebellion and was proposed as Sheriff for Rutlandshire, but objection was taken and he was not appointed (*Journal House of Commons December 1, 1646*).

The Digby lands were sequestered, but the mortgagee was allowed to receive the rents, until 1649, when the sale of the land was permitted, and Daniel's executors entered into possession.

which the Army refused to disband. But Parliament adopted measures every bit as tyrannical as the King's had been. On August 11, 1645, an ordinance was passed and sent to the Lords to give the Public Faith to such as have paid in their $\frac{1}{5}$ and $\frac{1}{20}$.

By the end of the first generation the Harveys had become owners of landed property in many counties. Daniel owned the Digby manors of Tilton and Stoke Drie in Leicestershire and Rutlandshire, Leiston near Saxmundham in Suffolk, lands in Thanet and Kent, Combe near Croydon in Surrey, and a house in Lambeth. Eliab owned a house in Roehampton, Cokayne House in Broad Street, then a street of great private mansions, purchased in 1654, the Chigwell estate including Rolls Park, the Hempstead estate, and Langford,* all in Essex, and Sutton Poyntz in Dorset. William had bought the Oxendons in Leicestershire, and Baron Parke in Northamptonshire, which he left to Eliab. Michael and William, the sons of Michael, owned Clifton Mabank, and Wyke Manor, near Sherborne, which had been bought, ostensibly by Eliab, for £21,000.³⁷

A few details may be added on the five commercial brothers.

Thomas Harvey, born at Folkestone, January 17, 1585, married (1) Elizabeth, daughter of Nicholas Exton of London, merchant, by whom he had two sons who died in infancy and John (called "of Antwerp") who survived him. The wife died in childhood, January, 1619. (2) Elizabeth, daughter of Sir Robert Parkhurst, Kent, of the Clothworkers' Company, Alderman and Lord Mayor, by whom he had a posthumous son, Thomas, who probably died in infancy. She, left a widow, married in 1624, Sir Edmund Sawyer, M.P., and died the same year.

Thomas Harvey died February 2, 1623, and was buried at St. Peter le

* Wright's Essex says that the brother Matthew bought Langford. This is wrong. Eliab bought it, and left it to his son Matthew. See Eliab's will.

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Poor. He left £4000 to his widow, and £5000 to be distributed at the discretion of Dr. Harvey and "Mr." Parkhurst, and the remainder (if the unborn son die under age) to his son John.

Daniel Harvey, born at Folkestone, May 31, 1587, of Laurence Pountney (where their place of business was), Combe in Croydon, and Lambeth. Married Elizabeth, daughter of Henry Kynnersley, merchant of London, by whom he had six children who died in infancy and the following who survived him:

Elizabeth, baptized April 19, 1627.

Mary, baptized September 3, 1629.

Daniel, baptized November 10, 1631.

Sarah, baptized September 8, 1636.

Daniel Harvey died September 10, 1649. He left £1200 a year to his widow, gave his daughters a portion of £7000 apiece, left legacies amounting to more than £5760 (among the legatees were Thomas Cullen and poor kindred on his father's side), and lands in Kent, Suffolk, Rutlandshire, Leicestershire and Surrey to his son Daniel. He mentions that he bought the land in Kent and Suffolk in his own name and in that of his brethren.

Elizabeth, his widow was buried at Lambeth, May 7, 1655.

Eliab Harvey, born at Folkestone, February 26, 1590, of Laurence Pountney, Broad Street in S. Peter le Poor, Roehampton and Chigwell.

Married in 1625, Mary, daughter of Francis West of London, gent., by whom he had four children who died young and the following who survived him:

Eliab, baptized June 3, 1635.

Mary, baptized November 15, 1637.

Matthew, baptized April, 1639.

William, baptized June 30, 1640.

Eliab Harvey built the Harvey Mortuary Chapel at Hempstead in 1655, and died May 27, 1661. He left £1500 a year to his widow with residence in his great messuage, and lands in Essex, Leicestershire, Northamptonshire, Dorset, the City of London and his great messuage, among his sons. Mary had received £10,000 on her marriage with Sir William Whitmore of Apley Shropshire, and is not mentioned in the will. He left Langford and the Leicestershire property to Matthew, the Northamptonshire and Dorsetshire properties to William, and the remainder to Eliab. His widow died in 1670.

Michael Harvey, born at Folkestone, September 25, 1593, of Laurence Pountney and S. Helen's, Bishopsgate. Married (1) in 1630 Mary daughter of William Baker, Draper of London, who died s.p. 1631. (2) Mary, daughter of John Mellish, Merchant Taylor, by whom he had:

Michael, b. 1636.

William, b. 1638.

Mary, b. 1641.

Michael was buried at S. Helen's, January 27, 1643.

His widow married William Steele, Recorder, of London, M.P., and Lord Chancellor of Ireland.

Matthew Harvey was a twin brother of Michael. He married Mary, daughter of Robert Hatley of London, and of Barford, Beds. by Dorothy, daughter of Griffith Hampden of Great Hampden, Bucks.

He died at Croydon without surviving issue, December 21, 1642. He left £300 a year to his widow, £700 in legacies, and £20 a year to William Foulke. Among the legatees are William, Thomas and Elizabeth Cullen, Mary Pratt (a Cullen by birth), William Halke, "son of my uncle

Richard Halke, now apprentice to my brother Daniel," and the poor of Folkestone and Croydon. He left lands "in Surrey and elsewhere" to "my cousin,"* Daniel Harvey the younger, son of my brother Daniel.†

VIII. THE LATER GENERATIONS

The second generation of the Harveys was very different from the first.

I have been unable to trace John, the son of Thomas, called John Harvey of Antwerp. The name was common then; John Harvey of Ickworth was M.P. for Hythe in 1661, as the former John Harvey had been in 1640, and Receiver for Charles II's Queen, and another John Harvey was Receiver General for Lincolnshire, the very office held by William's brother John, but the former of these men was certainly of a quite different family, and there is good reason to suppose that the same is true of the latter. John Harvey of Antwerp may be the Mr. Harvey who lent Charles £500 and entertained him at Antwerp while in exile.⁴⁰ He was living in 1670 for Eliab's widow left him a legacy. No will of his is to be found.

Daniel's son, young Daniel, married before 1656 Elizabeth Montague, daughter of Edward second Lord Montague of Boughton, and thus became connected with that family, which having been Parliament men originally, played a leading part in the Restoration. One cousin was Edward Montague Earl of Manchester who had been a Parliamentary general, another was Sir Edward Montague, the Parliamentary Admiral and

patron of Pepys, later created Earl of Sandwich, whose fleet brought the King to England, while Elizabeth's brother, Ned Montague, afterwards killed at Bergen, had for some time been intriguing in the royal interest. Young Daniel was therefore in the center of the royalist plots. He was elected M.P. for Surrey in the Convention Parliament of 1660, and was appointed High Sheriff of Surrey and Commissioner of the Surrey Militia. It is not, therefore, surprising that he and his cousin, young Eliab, who also had married into a royalist family, the Whitmores of Shropshire, were knighted by Charles on the first day that he landed.

Young Daniel had come into possession of Combe Nevill, an estate lying just opposite Richmond Park on Kingston Hill (to be distinguished from his father's house Combe near Croydon), which is stated in the Victoria County History of Surrey to have been bought from Lord Cullen, Sir William Cokayne's son, who ruined himself for Charles I, by Lord Montague of Boughton and others in 1650. Daniel perhaps obtained it with his wife. It is curious that old Eliab bought another Cokayne property, Cokayne House in the City.

Daniel was a courtier, was made Keeper of Richmond Park, and fought under Albemarle in the sea-fight of 1666 against the Dutch. He appears that year as a friend of the notorious Castlemaines. Lady Castlemaine, the most beautiful and the most shameless of Charles' mistresses, quarrelled with him over a baby, Charles swearing it was not his, and she swearing that, whether it was his or not, he should own it. She left Whitehall in a rage, and took up her residence with the

* Note the use of cousin for nephew at that time.

† My chief authority is W. J. Harvey, "Genealogy of the family of Harvey."

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Harveys, where the King made it up with her. But two years later the ladies quarrelled over an actress who took off Lady Harvey on the stage and was protected by Lady Castlemaine. It did not interrupt the friendship of the husbands, for when Daniel sailed in 1668 to Constantinople as Ambassador, Lord Castlemaine went with him for the trip. Daniel died there in 1672, but when his widow claimed a grant to pay for transporting his remains to England the Levant Company refused on the ground that the deceased had not completed his contract to remain there for seven years.

Ralph Montague, Lady Harvey's brother, was twice Ambassador at Paris, married a rich widow, and eventually succeeded in obtaining a dukedom. Lady Harvey herself remained at Court, with a doubtful reputation, acting in concert with Ralph in his intrigues, and joining in the unsuccessful attempt to displace the favorite Louise de Keroualle, Duchess of Portsmouth. Lady Harvey had some hand in the Royal Tapestry works at Mortlake as Sackville Crowe writes to the Countess of Rutland about some hangings the manufacture of which "is now in your neece's, the Lady Harvie's hands." The works were conveyed eventually to Ralph Montague. Sir Daniel's three sisters married well. Elizabeth married Heneage Finch, a good lawyer and an honorable man who afterwards became Lord Chancellor and Earl of Nottingham. They seem by their letters to have been an affectionate couple.⁴³

Heneage's cousin, Lord Winchilsea, preceded, and Winchilsea's younger brother, Sir John Finch, succeeded Sir Daniel in the Embassy at Con-

stantinople. During the Commonwealth Sir John had lived in Italy and had been Professor of Anatomy at Pisa. The anatomical preparations which we possess at the College of Physicians, though said by the donor, the tenth Earl of Winchilsea, to have belonged to Harvey, were probably brought by Sir John from Italy. He and his lifelong friend Baynes were admitted Extraordinary Fellows of the College on February 26, 1660, "*ob praeclara Doct^{is} Harvoei, nobis nunquam sine honore nominandi, ejusque fratris germani Eliabi, in Collegium merita.*"

William and Eliab were parties to the deed conveying Burmarsh to the College in 1652.

Daniel's next sister, Mary, evidently by her portrait a beautiful woman, married Sir Edward Dering the second baronet of Surrenden Dering. She was a musician and in 1655 Henry Lawes published a collection of Ayres which he dedicated to her in the following terms:

Madam,

I have considered, but could not find it lay in my power to offer this book to any but your Ladyship. Not only in regard of that honour and esteem you have for music but because those songs which fill this book have received much lustre by your excellent performance of them, and (which I confess I rejoice to speak of) some which I esteem the best of these Ayres were of your own composition, after your noble husband was pleased to give the words. For, (although your ladyship resolved to keep it private) I beg leave to declare for my own honour that you are not only excellent for the time you spent in the practice of what I set, but are yourself so good a composer that few of any sex have arrived to such perfection. So as this book (at least a part of it) is not dedicated but only

brought home to your ladyship. And here I would say (could I doe it without sadness) how precious to my thoughts is the memory of your excellent mother (that great example of Prudence and Charity), whose pious meditations were often advanced by hearing your voice. I wish all prosperity to your Ladyship and to him who (like yourself) is made up of harmony to say nothing of the rest of his high accomplishments of wisdom and learning. May you both live long happy in each other when I become ashes, who while I am in this world shall ever be found Madam

Your ladyships humble admirer and faithful Servant,

Henry Lawes.

She was on affectionate terms with her sister Elizabeth. There is a scandalous story about her in Hasted's "Kent," which contains so many flagrant errors that it is entirely unworthy of credit. The true story is probably given by Sir Roger Twysden in his notebook.⁴⁴ He knew Daniel Harvey for he was imprisoned with him in Lambeth House.

Let no woman who hath any misfortune in any kind unfit for a wife, and after comes to bee marryed conceale it from her husband, I myself have . . . the experience of it in a very good friend of mine Sir Edward Dering, who married M^{ss} Mary Harvey, daughter of Danyell Harvey a merchant of London, and was indeede contracted if not marryed to one William Hauke her cousin and her father's servant, one who had been his apprentice, but was now free, he in a morning going through Colmans Streete with her got her very young into the church and did with a ring marry her about 1645, and caused it to be registered in the book of marryages of the parish: she was in this to bee excused because hee assured her he had her father's consent . . . but her speaking very softly

at the tyme so as it could not be disposed she did assent unto it, and her the very day returning him his ring and dysclaiming it and never suffering him to come neare her, and her youth capable of being deceived, with the good friends her father made . . . so far that after a legal hearing in the Ecclesiastical Courts (for they were not then quite put downe) she was by sentence cleared, and—after to be marryed to Sir Edward Dering 1646 or 1647. Her friends and she told him all the fact and showed him her sentence for being free under the seal of the Court and they have lived very lovingly ever since. (She a good wife and a means of advancing the family.*)

The third sister, Sarah, married Lord Bulkeley, an Irish peer.

Sir Daniel's eldest son Edward succeeded to Combe Nevill, and sat in several Parliaments up to 1715 when he was implicated in the Jacobite rising, and had to be bailed out of prison by his cousins.† There is a story of him at the gaming table (in De Foe's tour through England and Wales), and by the terms of his will he seems to have been on unpleasant terms with his children. He married three times, the first wife and mother of his children being his cousin Elizabeth, daughter of young Eliab. He died at Dunkirk in 1736. He had three sons of whom the third, Michael, alone survived him, and all died without issue. The property was sold on Michael's death in 1748.

*(Last sentence probably added later.) I can find no marriage records of this date at Somerset House.

† The Editor of the sixth Edition of Guillim, 1724, after giving the coat says "is now born (Sic) by—Harvey of Combe Nevill in Surrey Esq.; son and heir of Sir Daniel Harvey etc." As his Christian name was not known it seems probable that he was then living abroad.

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Sir Daniel's second son, Daniel, owned Leiston, was a soldier under Marlborough and also a Member of Parliament. He became General in 1709 and Lieut. Governor of Guernsey in 1714. He married a connection, Ann, the only daughter of Ralph, Duke of Montague, and died without issue in 1732, though his wife seems to have had a daughter, Frances, by a previous husband.

The sons of Michael were William of Wyke Manor and Michael of Clifton Mabank. The former, a godson of Harvey's, died in 1685 of wounds received fighting for James II at Bridport. The latter sat in eight Parliaments, and died in 1712, without issue, like his brother, leaving the Dorset property to Michael, then a younger son of Edward of Combe Nevill.

The Eliab branch lasted longer. Sir Eliab remained in business and in 1672 was nominated, though not elected, for Governor of the Levant Company. His two brothers were also Members of the Company. He was frequently a Member of Parliament, was a Member of many Committees, and in 1680 was in Opposition demanding safeguards in return for supplies.⁴⁶ He enlarged Rolls Park, and was made Keeper of the King's game in that part of Epping Forest. He founded a grammar school at Folkestone and died in 1699. He married Dorothy Whitmore, his sister Mary married Dorothy's brother, Sir William, and his brother Matthew married the widow of another Whitmore, a very beautiful woman whose portrait is at Hampton Court.

An unusual event occurred in his family. Two of his sons married the same girl, Dorothy Dycer. She was married November 23, 1680, when

she seems by a previous betrothal to have been only twelve and one-half years old, to the eldest son Eliab, who died in June, 1681. The marriage had not been consummated, and on that fact being proved, a license was obtained and she was married to the next son William in September, 1681. She was an heiress. William sat in several Parliaments and died in 1731. Another son of Sir Eliab, Matthew, was page to William III and a soldier, dying in 1693. Sir Eliab's daughter Elizabeth married her cousin Edward of Combe Nevill.

Sir Eliab's two brothers Matthew and William both died childless.

The line continued, living at Rolls Park, and holding the other Essex properties, Hempstead being always the family burial place. A soldier, Edward, (1718-1778) who was Lieut. General and Governor of Portsmouth, appears two or three times as Ned Harvey in Walpole's Letters. In 1779 the Estate fell, by the death of an elder brother, into the hands of the last Sir Eliab, then a midshipman. Walpole tells the story of his losing £90,000 to an Irish gamester, called O'Birne, who took £10,000, and gave him the chance of a double or quits for the rest, which Eliab won. At Trafalgar he commanded the *Temeraire*, which was Nelson's supporting ship, and behaved with great bravery. But in 1809 he was in the Brest squadron under Lord Gambier, a pious man but a cowardly admiral, who distributed tracts with more zeal than he showed against the enemy. They had a French squadron cooped up in the Basque Roads, off Rochelle, and his captains implored him, as it was impossible to attack directly, to send fireships into them. He refused. The Admiralty made the same

request. He still did nothing. On this the Admiralty finding Cochran in London consulted him, and he, then a Captain, was sent out with definite orders that he was to be entrusted with the operation. This naturally was gall and wormwood to the officers on the spot, and justly ascribing it to Gambier's failure in duty that they were supplanted by Cochran and deprived of the chance of glory, they murmured greatly. Harvey did a great deal more than murmur, and Cochran in vain urged him to be more prudent. His language resulted in a court martial by which he was dismissed from the service for insulting his superior officer. But that the rights of the case were appreciated is shown by his reinstatement a year later to his former rank. He died in 1830, Admiral of the Blue and G.C.B. He married Lady Louisa Nugent, and left a family of five daughters but no

son. The eldest daughter married a Lloyd of Shropshire, and Rolls Park descended to Lt. Gen. Sir Francis Lloyd, G.C.V.O., K.C.B., who died without issue in 1923, and whose widow still lives there. The other estates were divided among the remaining daughters. No one of this family, bearing the name of Harvey, now survives.*

NOTE: I have to thank Mrs. Dorothy Wilson for the help she has given me throughout. I believe her interest was first engaged by finding that her father lived on the old Combe Nevill estate. She has copied all the Harvey Wills, and has constantly helped me in searching for original sources. It is to her sharp eyes that we owe the recovery of a portrait of Harvey hitherto unknown to the public, and most of the photographs of the Harvey homes were made by her during a drive we took in the summer of 1929.

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[The End]





[From Schenckius: *Observationum Medicarum*, Francofurti, 1609.]

EDITORIALS

THE RICHMOND ACADEMY OF MEDICINE

THE Richmond (Va.) Academy of Medicine celebrated the opening of its new building on September 20, 1932 in the presence of a large gathering of fellows and visiting physicians. The President, Dr. R. Finley Gayle, Jr., presided, and the speakers were Governor John Garland Pollard of Virginia, Dr. Stuart McGuire of Richmond, Chairman of the Building Committee, Dr. Edward H. Cary of Texas, President of the American Medical Association, and Dr. Francis R. Packard of Philadelphia, Editor of the *ANNALS OF MEDICAL HISTORY*.

The building faces the White House of the Confederacy at Twelfth and Clay streets, in that part of Richmond which was once its cultural center, and is adjacent to the Medical College of Virginia. With its adequate auditorium, library, offices, lounge and banqueting hall, it constitutes the first home the Academy has ever owned, the goal of oft-renewed and strenuous efforts of its membership over a long period of years.

The first organization of the medical profession in Richmond dates back to 1820 when the physicians of Manchester and Richmond were organized into what was then known as the Medical Society of Virginia. In 1850 a state-wide organization was effected, taking this name, and the Richmond faculty adopted the new title of the Medical and Chirurgical Society of Richmond. In 1865 a reorganization occurred and the Richmond Academy of Medicine came into existence. A rival organization, the Medical and

Surgical Society, was organized in 1880, but by 1890 the two had agreed to bury their differences in a new amalgamated association known as the Richmond Academy of Medicine and Surgery. In recent years the name was again changed to the earlier form, the Richmond Academy of Medicine. James McClurg, author of a creditable work on the human bile, was the first president. Succeeding him in office have been some of the South's leading physicians—William Foushee, one time mayor of the city, R. W. Haxall, Levin Joynes, James B. McCaw, Beverley R. Wellford, Hunter McGuire, Landon B. Edwards and George Ben Johnston.

In 1882 Dr. Joseph Toner of Washington offered to Richmond his magnificent collection of 28,000 books and manuscripts, with the provision that they should be housed in a fireproof building. The city was unable to take advantage of Dr. Toner's offer, and the library went to the Library of Congress. A few years ago Dr. J. L. Miller of Thomas, West Virginia, an alumnus of the Medical College of Virginia, offered to the Richmond Academy of Medicine his collection of old and rare books and other medical curios. This time the offer was immediately accepted and the present fireproof building houses Dr. Miller's benefaction.

The Miller Collection consists of a rare ivory obstetrical manikin, sixteenth, eighteenth and nineteenth century instruments, saddle-bags, old mortars and pestles, medicine chests and other interesting relics of former

medical practice. There are nearly 4000 portraits and prints of famous physicians, as well as about 300 autographed letters, chiefly from English and American doctors of note. Among the books there are eight medical incunabula. Conspicuous among these is Guy de Chauliac's "Surgery," 1499. Other interesting items are Vesalius's "Anatomy," 1555, second edition, rich in autographs and book plates of former owners, including George Baker, 1571, and Thomas Wharton; William Cheselden's "Osteographia," 1733, a rare dedication copy to Queen Caroline with the crown and royal cypher in gilt stamped in the morocco, and the royal arms in four-edge painting under the gilt edges; Paracelsus's "Chirurgia magna" and "Minor," 1573, showing paragraphs blotted out with hot irons by the Inquisition authorities; Thomas Gale's "Certaine Workes of Chirurgery," 1586; the rare first English edition of the "Works of Ambroise Paré," 1634; Damian Carbon's "Libro del arte de las comadres," 1541, the first Spanish work on obstetrics, of which only four copies are known to be in existence; Pratis's "De pariente et partu liber obstetricibus puerpera," 1527, also exceedingly rare; Thomas Raynalde's "Byrth of Mankynde," 1552; Jacob Rueff's "De conceptu et generatione hominis," 1580; William Harvey's "Anatomical Exercitationes concerning the Generation of Living Creatures," first English edition, 1653; second edition of Jenner's original work on vaccination; John Jones's "Bathes of Baths Ayde," 1572, and "Ancient Baths of Buckstone," 1572; and John Frampton's "Joyful News out of the New Found World," 1596.

The library also contains a unique collection of medical silhouettes. Twenty-one are of Virginia physicians. Notable among the subjects of these

are Gustavus R. Brown, Elisha Dick, James Craik, Walter Jones, James McClurg, J. Peter Mettauer and James McCaw. There are also interesting silhouettes of the two Moultries of South Carolina; Crawford Long of Georgia; Ephraim McDowell, Daniel Drake and Benjamin Dudley of Kentucky; Benjamin Rush, John Redman, John Morgan, William Shippen and Caspar Wistar of Pennsylvania; Valentine Mott, Samuel Bard, David Hosack and Wright Post of New York; Jacob Bigelow of Massachusetts; Elisha Bartlett of Rhode Island and Nathan Smith of Connecticut. Many of these silhouettes were cut by the famous artist, Charles W. Peale, and by the master silhouettists, William H. Brown and Agustin Edouart. The sixteen by Edouart, many gracefully posed against lithographic backgrounds, are perhaps the most delightful in the collection.

NOTICE

Since the publication of Dr. Bick's "Note on the Medical Works of Oliver Wendell Holmes" the Author has received a letter from the Librarian of the Boston Medical Library, Dr. Ballard, calling his attention to another of Dr. Holmes' earlier works: "The earliest known Medical work of Dr. Holmes is entitled 'A Dissertation on Acute Pericarditis,' January 12, 1836. It is, undoubtedly, his dissertation for his degree of M.D. from Harvard Medical School. So far as I know, it has not been published, but the original manuscript is in the Boston Medical Library."

Dr. Bick wishes this to be added to his list of Dr. Holmes' works, as he considers that in 1836 the interest in acute pericarditis would have been evinced only by a liberally educated young medico.



BOOK REVIEWS

MEDICINE AMONG THE AMERICAN INDIANS.
Clio Medica. By Eric Stone, M.D. 17 illus.
N. Y., Paul B. Hoeber, Inc., 1932.

This new addition to the series of little handbooks on special topics in medical history, known as *Clio Medica*, under the general editorship of Dr. Edward B. Krumbharr, is well calculated to maintain the high standard set by its predecessors. It is the best succinct account of the knowledge and practice of medicine by the Amerinds of which we know, and is written with every evidence of a profound knowledge of the subject by its author. Like all primitive peoples the American Indian attributed disease to supernatural influences, either the malevolence of evil spirits or gods, or the action of some enemy possessing occult power. The author explains that the word "Medicine" had a much wider significance than with us. It might refer to an herb or object having healing properties, but it usually signified some article or agency supposed to possess supernatural power: "It might be an animal, a bit of wood, a finger from a powerful foe, a spear or a pipe." Some of these articles possessing healing or otherwise benign properties were "good medicine," those having influence for evil were "bad medicine." There was no priestly caste among the Amerinds, the medicine-men being individuals, usually chiefs, who were supposed to possess supernatural power. They numbered women among them. In some tribes the medicine men formed a society, into which members were adopted by a process of initiation. On ceremonial occasions, or when exercising their rites they wore a peculiar garb, usually fantastic masks or hats, sometimes robes or other objects appropriate to the particular god of the group or clan. The term "medicine bag"

did not apply to the wallet carried by a shaman; every Indian had one, but the medicine man usually carried in his certain articles peculiar to his professional activities. The descriptions of the "bull-roarers," medical necklaces and cords, used for therapeutic or magical purposes are of great interest.

Contagious diseases were practically unknown to Indians before the advent of the whites, when they fell ready victims because of lack of any racial immunity. Digestive disorders were common because of frequent periods of semi-starvation alternating with periods of abundance with gross overeating. Dr. Stone describes the various drugs used empirically, and therapeutic measures, such as sweatbaths, which prevailed throughout most of the tribes. The measures adopted against poisoning by venomous snakes were in many instances most efficacious. The obstetric procedures employed by different tribes varied greatly, but the mortality for both mother and child was surprisingly low. Indian wound surgery was quite wonderful. They appreciated the value of cleanliness, and of removing foreign bodies from the wound, used sutures made of animal sinews on bone needles, and controlled hemorrhage by tourniquets, or packing with styptics, such as spider's web, eagle's down, or smooth sumach. Fractures were treated by the Shoshones with a splint of fresh rawhide. The leather was softened in water, and moulded to the parts after the fracture had been set. When the leather dried it formed a cast which held the fragments immobile. When the fracture was compound a window was cut in the cast over the wound.

The author ends his work with the statement:

The medical practices of the American Indian, living in the practical equivalent of our Stone Age, were marked by sincerity, confidence and picturesqueness and were in many respects effective. Much of their work had a rational basis and at a few points they were in advance of the civilized practice of their day and age.

This is not only an erudite, but a charmingly written study of a phase of medical history of which, though much has been written, the material is largely lost in archives or journals, and not readily available. Dr. Stone has done a great service in presenting the subject to us.

PHYSICAL THERAPY. By John S. Coulter, M.D., Assistant Professor of Physical Therapy, Northwestern University Medical School, Chicago. *Clio Medica*. N. Y., Paul B. Hoeber, Inc., 1932.

This latest volume of "*Clio Medica*" maintains the high standard of its predecessors and within the limits of a small volume gives a most complete outline of the history of physical therapy from Hippocrates to the present day. It is curious as well as sad, that this field of practice, so useful and frequently simple, has been so fruitful a field for quackery and charlatanry from the earliest days. As the Author states in his preface the history of physical therapy should be of great value to the physician of today when the world is flooded with advertisements of all kinds of mechanical devices for exercise and massage, the great majority of which are simply thefts from primitive times. The history of physical therapy is entirely too unfamiliar to most of us, as a perusal of Dr. Coulter's little book will easily demonstrate. The first chapter covers from the time of Greeks and Romans to the Renaissance. The Greeks developed gymnastics as an art and applied it not only in health but also in disease. In the Middle Ages much attention was paid to bathing and massage by many physicians. In the second chapter

and massage. The important part which John Hunter took in the development of the proper use of exercise in the restoration of muscles and joints is usually overlooked. He laid the foundation, as Coulter points out, of the modern idea of muscle reeducation. The first book on orthopedics was written by Nicolas Andry of Paris in 1741. He taught the proper use of rest, massage and friction, used cold douches over the spine, and pushed and rubbed the "spinal-hunch," like any modern osteopath. Coulter gives an interesting description of the origin of the famous Swedish and German gymnastics. Both arose out of the Napoleonic Wars, Jahn in Germany and Ling in Sweden desiring to improve the physique of their countrymen so as to furnish their respective countries with men better fitted to bear arms, in case of further aggressions. Jahn invented the term "*Turn*" for his gymnasia, and it has been perpetuated in the numerous Turnverein which still flourish on Teutonic soil.

Water therapy is dealt with in Chapter III, including the famous bathhouses in vogue in the medieval cities, the spas, the use of the cold and hot bath in various conditions, including James Currie's first attempt at systematizing the use of the cold douche or bath in fevers, Benjamin Rush's use of the icebag on the head of febrile patients, the water cures of the layman Priessnitz, and the labors of Winternitz to establish hydrotherapy on a scientific basis. In the next chapter the use of electricity as a therapeutic agent is described. In the eighteenth century electrical therapy was dabbled in by many laymen, John Wesley and Benjamin Franklin being among the most distinguished. It was eagerly taken up by quacks, such as James Graham, whose "*Temple of Health*" in London owed a large part of its success to the seductive charms of the future Lady Hamilton, better known to fame as the mistress of Horatio Nelson. Elisha Perkins claimed that his "*Metallic Tractors*" transmitted electricity, and the filthy Marat, the

French revolutionist, wrote a book on electricity and claimed remarkable success in its use. Duchenne was the greatest of the pioneers in the scientific use of electricity, and since his day it has been used with intelligence as a diagnostic and therapeutic measure. In the last chapter Dr. Coulter deals with "Radiant Energy" and describes the work of Roentgen and the Curies. This little book is a very complete manual of the history of physical therapy. A number of illustrations increase its interest, and an excellent bibliography and index add greatly to its value.

KYKLOS, Jahrbuch für Geschichte und Philosophie der Medizin, Band 4, 1932.

Owing to the economic depression the present volume of *Kyklos* is much smaller than its predecessors. It contains only a single essay, "The History of Hippocratism in the Declining Years of Antiquity," which represents the Habilitationsschrift of the well-known scholar Owsei Temkin. The article deals with the various post-Hippocratic sects and will be a valuable source of reference for all interested in the history of medicine in Greece, in Alexandria and in Rome.

A brief report of the director of the Historical Institute at Leipzig is added. Presumably this is Professor Sigerist's last contribution in his present post, as he will take over the directorship of the Institute of the History of Medicine at Johns Hopkins University this autumn.

DAVID RIESMAN.

CALIFORNIA'S MEDICAL STORY. By Henry Harris, M.D. With an Introduction by Charles Singer, M.D., D. Litt. San Francisco, J. W. Stacey, Inc., 1932.

As a result of the awakening of interest in the medical history of this country there have been published recently a number of most valuable contributions to the medical annals of various states, cities and localities which will greatly lighten the labors of future medical historians. As Dr. Singer states in the Intro-

duction, this work by Dr. Harris may be justly termed "a model local history." The Author has gone to the original sources wherever possible and thoroughly documented his story throughout, as is manifested by the excellent bibliography at the conclusion. An excellent index also adds much to the value of the book. Dr. Harris has also described the general historical background throughout the entire period, thereby adding greatly to the pleasure of the perusal of his large volume.

The book is divided into eight sections. The first deals with medicine as practiced by the Indians of California, which was largely a mixture of theurgic practices, with the addition of some empiric remedies and physiotherapy. Some of their surgical procedures were remarkably successful. There is an excellent summary of the scanty information available concerning the devastating and mysterious epidemics which prevailed from time to time among the Indians. Section II is concerned with the period of the Spanish occupation, and gives a terrible picture of the loss of life, chiefly from scurvy, among the sailors and soldiers who organized the early settlements. Most of the expeditions were accompanied by well-trained physicians, and many of the measures they adopted to combat the mortality of the troops in their care were well devised. The Mexican period is described in the third section. In 1848 California passed legally into the possession of the United States, and Section IV deals with the early years of the gold rush, which brought among its crowd of adventurers many doctors of all sorts and descriptions from all parts of the world. Section V describes how order was gradually evolved from the chaos of the gold fever and the profession of medicine began to assume its proper functions and acquire a due standing. The remaining sections deal with the progress of medical education, teaching and practice to the present day. Though not so picturesque as the records

of the previous years they are of great value because they narrate the history of a wonderful development in medicine in a comparatively short period. This is a great story well told.

ENGLISH-SPEAKING STUDENTS OF MEDICINE AT THE UNIVERSITY OF LEYDEN. By R. W. Innes Smith, M.D. (Edinb.) With a Foreword by John D. Comrie, M.D., F.R.C.P. Edin. Edinburgh, Oliver and Boyd, 1932.

In a brief but most interesting introduction Dr. Innes Smith relates the story of the founding of the University of Leyden, a tribute to the intelligence and character of its citizens. After the citizens had withstood the famous siege of 1774, William the Silent offered them as a reward freedom from taxes for ten years, or a university. They chose the latter. Before this the only university in the Low Countries was Louvain, which only admitted Roman Catholics as students. The new university opened its doors not only to those of the Protestant faith who founded it but also to those of any other religious belief, including Jews and Roman Catholics. Established on such a broad and liberal base no wonder it was successful from the outset. Among the earliest teachers on its medical faculty were Peter Forest and Gerard de Bontius, both of whom had been students at the then greatest medical center in the world, Padua. During the civil and religious wars and distractions which prevailed in England, Scotland and France throughout the seventeenth century students of all faiths and political opinions could study at the University of Leyden in peace and tranquility side by side. Until the middle of the eighteenth century it maintained its eminence, not only because of this fact but also because its faculty maintained the high standard with which it started. The illustrious Boerhaave alone was a magnet to draw multitudes. The influence of Leyden on medical education and practice was continued and diffused because the students who left it returned to their native lands imbued with its great

traditions. The medical school at Edinburgh which replaced Leyden in fame in the latter half of the eighteenth century, was founded by men who were its former students and it is well known that the oldest medical school in the United States was founded in turn by men who had all of them graduated from Edinburgh. Dr. S. Weir Mitchell said that genealogically speaking the medical school of the University of Pennsylvania was the child of Edinburgh and the grandchild of Leyden.

Dr. Innes Smith's work is much more than a mere list of the "English-Speaking Students of Medicine at the University of Leyden." He gives not only the facts to be derived from the registers or lists of the University, but information, much of it hitherto inaccessible, of where they came from, and what they did after leaving Leyden. Included in the list are quite a number of Americans. Owing to peculiarities in spelling, latinization of surnames, and difficulty in transcription, Dr. Innes Smith's task must have been most arduous. It has been splendidly accomplished and this book will form a necessary part of the equipment of anyone who wishes to study or write on the history of medicine from 1575 in Great Britain or America.

THE NOTE-BOOK OF EDWARD JENNER IN THE POSSESSION OF THE ROYAL COLLEGE OF PHYSICIANS OF LONDON. With an Introduction on Jenner's work as a Naturalist by F. Dawtrey Drewitt, M.D. (Oxon), F.R.C.P., Formerly on the Committee of the British Ornithologists' Union, and on the Council of the Zoological Society of London. Oxford Univ. Press, London, Humphrey Milford, 1931.

This is the third notebook of Jenner that has been published in recent years. Dr. Le Roy Crummer, of California, published one of them which was in his possession in the *ANNALS* in 1929.¹ It was especially valuable because its contents contained much relating to his work on vaccination. It had been the property of

¹ ANN. MED. HIST., n.s., 1: 4, 1929.

one of Jenner's nephews, and had been utilized by Baron in preparing his "Life of Edward Jenner." In 1931 Miss C. Doris Hellman published¹ a Jenner diary which was owned by her father, Dr. Alfred M. Hellman, of New York. The annotations are very various and chiefly concerned with events occurring in the daily routine of Jenner's life. The note-book published now for the first time from the manuscript in the Royal College of Physicians is a fine complement to the other two. It is a pity they cannot all be published together in a single volume.

In a very delightful introduction Dr. Drewitt tells of the great interest in natural history which developed in England in the latter half of the eighteenth century, which was manifested by the publication of many really valuable contributions to zoology, such as those of George Edwards and Thomas Pennant, the beautifully illustrated volumes on British quadrupeds and birds by Thomas Bewick and the delightful "Natural History of Selborne" by Gilbert White. Although Jenner's discovery of vaccination is his chief title to posthumous fame, he was probably more interested in natural history than in medicine. He was one of John Hunter's favorite students and Hunter wanted him to practice in London; he was offered the position of naturalist to Captain Cook's second expedition but Jenner refused to leave his village of Berkeley, where he lived the life of a rural practitioner and could study the ways of animals and birds in their natural habitats. Although a talented man in other lines than medicine and natural science (he was a good musician and wrote some tolerable verse), Jenner was apparently devoid of ambition and wisely followed the career in which he found the greatest happiness and could do the most good.

This manuscript note-book of Dr. Jenner's was presented to the Royal College of Physicians in 1888 by Dr.

Jeffery Allen Marston. There is no indication as to how it came into Dr. Marston's possession. It contains the bookplate and the name of George Charles Jenner, a nephew of Edward Jenner's. The notes it contains were written at various intervals between 1787 and 1806. They are almost all concerned with animals with the exception of a few casual notes on the occurrence of hydatid cysts in human beings. The most important are those dealing with the habits of the cuckoo, which formed the basis of the remarkably interesting paper on the subject which was presented for Jenner to the Royal Society by John Hunter, and published in the *Philosophical Transactions* in 1788. In his notes on hydatid cysts Jenner enunciates the view that tubercles in the lungs or elsewhere originated as hydatid cysts. He autopsied a number of dogs which had died from distemper and records his findings, the lungs universally inflamed and the bronchi filled with frothy purulent matter tinged with blood. The book is a valuable personal record, throwing light on Jenner's characteristics as well as his scientific work.

MEDICAL ASPECTS OF OLD AGE. Being a revised and enlarged edition of the Linacre Lecture, 1922. By Sir Humphry Rolleston, Bart., G.C.F.O., K.C.B., M.D., Hon. Disc., D.C.L., Leg. LL.D., Regius Professor of Physic in the University of Cambridge, Physician-in-Ordinary to the King, Sometime President of the Royal College of Physicians, London. Macmillan, 1932.

Rolleston begins his consideration of the medical aspects of old age by a review of the biologic studies which have been so persistently carried out on the duration and prolongation of life in the protozoa, which have demonstrated that though senescence does occur in the protozoa, death is often avoided in them by a process of rejuvenescence. "In the higher forms of animal life rejuvenescence is restricted by the evolutionary increase in the physiological stability of the protoplasmic substratum and the resulting

¹ ANN. MED. HIST., n.s., 3: 681, 1931.

higher degree of individualization and senescence and death are inevitable." As this condition has resulted from millions of years of evolutionary equilibration, the hope of bringing about any more frequent rejuvenation or retardation of senescence in the higher animals is remote. An analysis of the deaths of aged persons shows that few die of uninterrupted senescence or decay, death as a rule being due to some intervening cause, pneumonia, etc. which lack of vitality renders the aged victim unable to resist. Careful study of reputed cases of extreme old age, such as Parr, Jenkins, etc. reveals that the statements on which their claims to longevity are based are as a rule not dependable. Heredity seems to have a powerful influence on human longevity, so that if long-lived families were mated and bred together the length of the lives of their offspring would probably be prolonged. Statistics show that a larger number of people now attain old age, but Rolleston states this is to some extent a survival of the less fit, and gives no indication that the span of human life is in process of extension towards the century mark.

This is a delightful resumé of the medical aspects of a most complicated and interesting problem. Sir Humphry has in the highest degree the rare gift of conciseness in the presentation of a large subject with adequate consideration of its important aspects. There is just now widespread popular as well as scientific interest in the problem of old age, particularly in reference to its avoidance by some process of rejuvenation. A book such as Sir Humphry has written with its sane outlook, depth of erudition, and philosophic conceptions is called for and we feel sure will receive a hearty welcome.

THE CAMBRIDGE MEDICAL SCHOOL. A Biographical History. By Sir Humphry Rolleston, Bart., G.C.V.O., K.C.B., M.D., Hon. D. Sc., D.C.L., LL.D., Regius Professor of Physic in the University of Cambridge; Physician-in-Ordinary to H. M. The King;

Sometime President of the Royal College of Physicians of London. Cambridge Univ. Press. 1932.

In the early part of the thirteenth century Cambridge was referred to as an university in a writ of King Henry III, and in 1318 it was officially recognized as such by a Bull of Pope John XXII. It was a "Master-University," or corporation of Magistri or teachers, as contrasted with some of the early Italian universities, such as Bologna and Padua, whose affairs were chiefly controlled by the students' organizations or guilds. There were three Faculties; Law, Theology and Physic. The first recorded degree of M.D. conferred by Cambridge was given in 1460-61. Rolleston gives an outline of the course of study from the Old Procter's Book of about 1396, which shows that it was very similar to that pursued in the Continental universities of the period. In the early years of the sixteenth century Thomas Linacre did much to advance the status of medical education and practice in England by founding two lectureships at Oxford and one at Cambridge, and getting a charter from Henry VIII, establishing the Royal College of Physicians of London, with power to control the licensing of medical practitioners. In 1540 Henry VIII created the Regius Professorship of Physic at Cambridge, and in 1557 the learned Dr. John Caius refounded Gonville College. In spite of these encouraging factors the teaching of medicine at Cambridge languished, Rolleston thinks largely because of academic prejudice and the corresponding importance lent to the other faculties rather than to that of physic. Things medical went from bad to worse and Rolleston says "the least satisfactory period of the University was the eighteenth century." Although he gives a list of some distinguished men who gave courses of lectures there, the medical courses were very uneven in quality and very irregularly given. But in the early years of the nineteenth century there came a change. The lecture courses were systematized, attendance on them made

compulsory, and candidates for degrees were required to present certificates of study in some hospital. Sir George Murray Humphry and Alexander Macalister placed the teaching of anatomy on the highest plane, and a little later Michael Foster developed the teaching of physiology and experimental research in that subject to a point not excelled anywhere else in the world, gathering about him as pupils and assistants men like Newell Martin, J. N. Langley, and W. H. Gaskell, whose work won for the "Cambridge School" universal recognition and honor. From 1892 to 1925 the Regius Professor of Physic was Sir Thomas Clifford Allbutt, one of the most brilliant and scholarly of English physicians, and until recently the incumbent of the chair was the no less distinguished and learned author of the present volume. Sir Humphry has compiled a most valuable as well as interesting biographical record of the teachers in the Cambridge Medical School from its early days to the present. The book contains many interesting portraits and is well indexed.

CLASSIC DESCRIPTIONS OF DISEASE, WITH BIOGRAPHICAL SKETCHES OF THE AUTHORS. By Ralph H. Major, M.D., Professor of Medicine, University of Kansas School of Medicine. Springfield, Ill., Thomas, 1932.

There is probably no way by which the interest of students of medicine in the history of their profession can be better aroused than by presenting to them the original texts of the important or epoch-making contributions which have laid the foundation of modern scientific medicine. But these original descriptions of diseases or discoveries are in most instances buried in rare and valuable books, or in periodicals or tracts only to be found in some of the great medical libraries. Even when the more ancient works are available the important text is often in Greek or Latin, or in a foreign language and frequently buried among much other material of less importance but rendering that which is sought difficult to find. In recent years a

number of books have appeared making available to all English-speaking students the fundamental writings of the authorities on a number of subjects. We may mention a few such as Camac's "Epoch-making Contributions to Medicine," Esmond Long's "Selected Readings in Pathology," and John C. Fulton's "Selected Readings in Physiology." The present volume fulfils on a large scale the same project for clinical medicine.

Dr. Major's practical experience as a teacher and his profound knowledge of the sources of medical history are both illustrated by the critical sagacity he has shown in the choice of the three hundred and seventy-six selections which he reproduces. A careful perusal has failed to reveal a single one which could be deemed superfluous and leaves one with the feeling that none has been omitted which could be regarded as a necessary addition. The Author has included in each selection all of the text which is necessary for its complete understanding. The translations are in some instances taken from the standard English editions, such as those by Francis Adams of Hippocrates and Aretaeus, and by John Forbes of Laënnec, but they are always reliable and show that the compiler of the present volume has read and compared them with care. The biographic sketches though concise are adequate. There are one hundred and fifty excellent illustrations, portraits, facsimiles, etc., many of which are rare or reproduced for the first time. The book is indexed, and an especially comprehensive, well-classified table of contents adds greatly to its value. As a book of reference Dr. Major's work is invaluable and for pleasurable reading we can heartily recommend it. Many a student or teacher with a book such as this at hand will avail himself of the opportunity to read up matter, which if he were obliged to search for in a library he might find impossible of attainment. The book though a large octavo is quite light, and its handsome get-up adds very much to its charm.

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